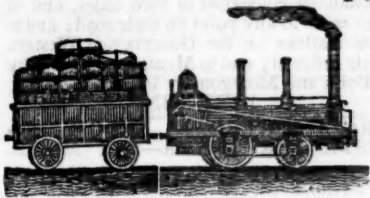


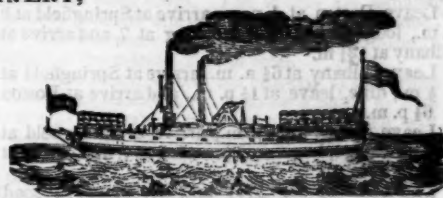
Cuyahoga Steam Furnace

# AMERICAN RAILROAD JOURNAL, AND GENERAL ADVERTISER

FOR RAILROADS, CANALS, STEAMBOATS, MACHINERY,  
AND MINES.



ESTABLISHED 1831.



PUBLISHED WEEKLY, AT No. 23 CHAMBERS STREET, NEW YORK, AT FIVE DOLLARS PER ANNUM.

SECOND QUARTO SERIES, VOL. II, No. 26.]

SATURDAY, JUNE 27, 1846.

[WHOLE No. 523, VOL. XIX.

## BOSTON AND PROVIDENCE RAILROAD.

Passenger Notice. Summer Arrangement. On and after Monday, April 6, 1846, the Passenger Trains will run as follows:

For New York—Night Line, via Stonington. Leaves Boston every day, but Sunday, at 5 p.m. Accommodation Trains, leave Boston at 7½ a.m. and 4 p.m., and Providence at 8 a.m. and 4½ p.m. Dedham trains, leave Boston at 8 a.m. 12½ m., 3½ p.m., and 6½ p.m. Leave Dedham at 7 a.m. and 9½ a.m. and 2½ and 5½ p.m. Stoughton trains, leave Boston at 11½ a.m. and 5½ p.m. Leave Stoughton at 7:20 a.m. and 3½ p.m. All baggage at the risk of the owners thereof. 31 ly W. RAYMOND LEE, Sup't.

BRANCH RAILROAD AND STAGES CONNECTING with the Boston and Providence Railroad. Stages connect with the Accommodation trains at the Foxboro' Station, to and from Woonsocket. At the Seekonk Station, to and from Lonsdale, R. I. via Pawtucket. At the Sharon Station, to and from Walpole, Mass. And at Dedham Village Station, to and from Medford, via Medway, Mass. At Providence, to and from Bristol, via Warren, R. I.—Taunton, New Bedford and Fall River cars run in connection with the accommodation trains.

## NORWICH AND WORCESTER RAILROAD.

Summer Arrangement, commencing Monday, April 6, 1846. Accommodation Trains, daily, except Sunday. Leave Norwich, at 6 a.m., and 4½ p.m. Leave Worcester, at 10 a.m., and 4½ p.m.

The morning Accommodation Trains from Norwich, and from Worcester, connect with the trains of the Boston, and Worcester and Western railroads each way.

The Evening Accommodation Train from Worcester connects with the 1½ p.m. train from Boston.

New York Train via Long Island Railroad: Leave Allyn's Point for Boston, about 1 p.m., daily, except Sunday.

Leave Worcester for New York, about 10 a.m., stopping at Webster, Danielsonville, and Norwich.

New York Train via Steamboat—Leave Norwich for Boston, every morning, except Monday, on the arrival of the steamboat from New York, stopping at Norwich and Danielsonville.

Leave Worcester for New York, upon the arrival of the train from Boston, at about 4½ p.m., daily, except Sunday, stopping at Webster, Danielsonville and Norwich.

Freight Trains daily each way, except Sunday.—Special contracts will be made for cargoes, or large quantities of freight, on application to the superintendent.

Fares are Less when paid for Tickets than when paid in the Cars. 32 ly J. W. STOWELL, Sup't.

## BOSTON AND MAINE RAILROAD.

Upper Route, Boston to Portland via, Reading, Andover, Haverhill, Exeter, Dover, Great Falls, South & North Berwick, Wells, Kennebunk and Saco.

Summer Arrangement, 1846.

On and after April 13, 1846, Passenger Trains will leave daily, (Sundays excepted,) as follows:

Boston for Portland at 7½ a.m. and 2½ p.m. Boston for Great Falls at 7½ a.m., 2½ and 4½ p.m. Boston for Haverhill at 7½ and 11½ a.m., 2½, 4½ and 6 p.m.

Boston for Reading at 7½, 9, and 11½ a.m., 2½, 4½, 6 and 8 p.m.

Portland for Boston at 7½ a.m., and 3 p.m. Great Falls for Boston at 6½ and 9½ a.m., and 4½ p.m.

Haverhill for Boston at 6½, 8½, and 11 a.m., and 4 and 6½ p.m.

Reading for Boston at 6½, 7½ and 9½ a.m., 12 m., 1½, 5 and 7½ p.m.

The Depot in Boston is on Haymarket Square. Passengers are not allowed to carry Baggage above \$50 in value, and that personal Baggage, unless notice is given, and an extra amount paid, at the rate of the price of a Ticket for every \$500 additional value.

CHAS. MINOT, Super't.

## TROY AND GREENBUSH RAILROAD.

Spring Arrangement. Trains will be run on this Road as follows, until further notice, Sundays excepted.

Leave Troy at 6½ A.M. Leave Albany at 7 A.M.

" " 7½ " " " 8 " "

" " 8½ " " " 9 " "

" " 9½ " " " 10 " "

" " 10½ " " " 11 " "

" " 11½ " " " 12 M. "

" " 1 P.M. " " 1½ P.M. "

" " 2 " " " 2½ " "

" " 3 " " " 3½ " "

" " 4 " " " 4½ " "

" " 5 " " " 5½ " "

" " 5½ " " " 6 " "

" " 6½ " " " 7 " "

The 6½ a.m. and 2 o'clock p.m. runs from Troy, to Boston runs.

The 12 m. and 6 o'clock p.m. trains from Boston runs.

Passengers from Albany will leave in the Boston Ferry Boat at the foot of Maiden Lane, which starts promptly at the time above advertised.

Passengers will be taken and left at the principal Hotels in River Street, in Troy, and at the Nail Works and Bath Ferry.

L. R. SARGENT, Superintendent.

Troy, April 1st, 1846.

## SUMMER ARRANGEMENT.—NEW YORK AND ERIE RAILROAD LINE, from April

1st until further notice, will run daily (Sundays excepted) between the city of New York and Middletown, Goshen, and intermediate places, as follows:

FOR PASSENGERS—

Leave New York at 7 A.M. and 4 P.M. " Middletown at 6½ A.M. and 5½ P.M.

FARE REDUCED to \$1 25 to Middletown—way in proportion. Breakfast, supper and berths can be had on the steamboat.

FOR FREIGHT—

Leave New York at 5 P.M. " Middletown at 12 M.

The names of the consignee and of the station where to be left, must be distinctly marked upon each article shipped. Freight not received after 5 P.M. in New York.

Apply to J. F. Clarkson, agent, at office corner of Duane and West sts.

H. C. SEYMOUR, Sup't.

March 25th, 1846.

Stages run daily from Middletown, on the arrival of the afternoon train, to Milford, Carbondale, Honesdale, Montrose, Towanda, Owego, and West; also to Monticello, Windsor, Binghamton, Ithaca, etc., etc. Agent on board. 13 lf

## NEW YORK & HARLEM RAILROAD CO.—Summer Arrangement.

On and after Friday, May 1st, 1846, the cars will run as follows:

Leave City Hall for Yorkville, Harlem and Morrianna, at 7, 8, 9, 10 and 11 a.m., and at 1, 2, 3, 30, 4, 30, 5, 6, and 6 30 p.m.

Leave City Hall for Fordham and Williams' Bridge, at 7, 10 and 11 a.m., and at 2, 3, 30, 5, and 6 30 p.m.

Leave City Hall for Hunt's Bridge, Bronx, Tuckahoe, Hart's Corners and White Plains, at 7 and 10 a.m., and at 2 and 5 p.m.

Leave Harlem and Yorkville, at 7 10, 8 10, 9, 10, 11 10 a.m., and at 12 40, 2, 3 10, 5 10, 5 30, 6 10, and 7 p.m.

Leave Williams' Bridge and Fordham, at 6 45, 7 45, and 10 45 a.m., and at 12 15, 2 45, 4 45, and 5 45 p.m.

Leave White Plains, at 7 and 10 a.m., and at 2 and 5 p.m.

The freight train will leave the City Hall at 1 o'clock, p.m., and leave White Plains at 1 o'clock in the morning.

On Sundays, the White Plains train will leave the City Hall at 7 a.m. and 5 30 p.m.; will leave White Plains at 7 a.m. and 6 p.m.

On Sundays, the Harlem and Williams' Bridge trains will be regulated according to the state of the weather. 13



**LITTLE MIAMI RAILROAD.—1846.—**  
Summer Arrangement.

Two passenger trains daily.  
On and after Tuesday, May 5th, until further notice, two passenger trains will be run—leaving Cincinnati daily (Sundays excepted) at 9 a. m. and 1½ p. m. Returning, will leave Xenia at 5 o'clock 50 min. a. m., and 2 o'clock 40 min. p. m.  
On Sundays, but one train will be run—leaving Cincinnati at 9, and Xenia at 5 50 min. a. m.

Both trains connect with Neil, Moore & Co.'s daily line of stages to Columbus, Zanesville, Wheeling, Cleveland, Sandusky City and Springfield.

Tickets may be procured at the depot on East Front street.

The company will not be responsible for baggage beyond fifty dollars in value, unless the same is returned to the conductor or agent, and freight paid at the rate of a passage for every \$500 in value above that amount.

W. H. CLEMENT,  
Superintendent.

19

**ATLANTIC AND ST. LAWRENCE RAILROAD.—**Notice to Contractors.—Proposals will

be received at the office of the Atlantic and St. Lawrence railroad company in this city, from the 17th to the 27th day of June next, for the grading, masonry and bridging of a division of the road, extending from a point at or near Portland to Royall's river in North Yarmouth—a distance of about eleven miles.

Plans, profiles and specifications will be exhibited, and the requisite information given at the engineer's office in Portland on and after the 17th day of June.

Persons offering to contract for the work, or any part of it, who are unknown to the undersigned or the directors of the company, will be required to accompany their proposals with references as to character and ability.

A further extension of the road, embracing a distance of some fifteen or more additional miles, will be prepared for and put under contract about the first of August next.

By order of the Board of Directors.

WM. P. PREBLE, President.

A. C. MORTON, Chief Engineer.

Portland, Me., May 18, 1846.

1m22

ENGINEERS' AND SURVEYERS'  
INSTRUMENTS MADE BY  
EDMUND DRAPER,  
Surviving partner of  
STANCLIFFE & DRAPER.



No 23 Pear street,  
below Walnut,  
1y10 near Third, Philadelphia.

**MACHINE WORKS OF ROGERS,**  
Ketchum & Grosvenor, Patterson, N. J. The undersigned receive orders for the following articles, manufactured by them of the most superior description in every particular. Their works being extensive and the number of hands employed being large, they are enabled to execute both large and small orders with promptness and despatch.

**Railroad Work.**

Locomotive steam engines and tenders; Driving and other locomotive wheels, axles, springs & flange tires; car wheels of cast iron, from a variety of patterns, and chills; car wheels of cast iron with wrought tires; axles of best American refined iron; springs; boxes and bolts for cars.

Cotton, Wool and Flax Machinery of all descriptions and of the most improved patterns, style and workmanship.

Mill gearing and Millwright work generally; hydraulic and other presses; press screws; callenders; lathes and tools of all kinds; iron and brass castings of all descriptions.

ROGERS, KETCHUM & GROSVENOR,  
445 Paterson, N. J., or 60 Wall street, N. York.

**WILLIAM R. CASEY,** Civil Engineer,  
New York. Address Box 1078, Post-office.  
New York.

**RAILROAD SCALES.—THE ATTENTION** of Railroad Companies is particularly requested to Ellicott's Scales, made for weighing loaded cars in trains, or singly, they have been the inventors, and the first to make platform scales in the United States; supposing that an experience of 20 years has given a knowledge and superior advantage in the business.

The levers of our scales are made of wrought iron, all the bearers or fulcrums are made of the best cast steel, laid on blocks of granite, extending across the pit, the upper part of the scale only being made of wood. E. Ellicott has made the largest Railroad Scale in the world, its extreme length was one hundred and twenty feet, capable of weighing ten loaded cars at a single draft. It was put on the Mine Hill and Schuylkill Haven Railroad.

We are prepared to make scales of any size to weigh from five pounds to two hundred tons.

ELLICOTT & ABBOTT.

Factory, 9th street, near Coates, cor. Melon st.  
Office, No. 3 North 5th street,  
Philadelphia, Pa.

1y25

**MARAMEC IRON WORKS FOR SALE.**

By Authority of a power of Attorney from Messrs. Massey and James, I will sell at Public Auction, at the Court House in the city of St. Louis, on **MONDAY, the 2nd day of November next,** the above named valuable **IRON WORKS**—together with **8,000 ACRES OF LAND**, more or less, on which there are several valuable and productive Farms open and in cultivation.

The Maramec Iron Works are situated at the Maramec Big Spring, in Crawford Co., Mo., and consist of

- 1 **BLAST FURNACE**; 1 **AIR FURNACE**;
- 1 **REFINING FORGE**, with large Hammer for making Blooms and Anchovies;
- 2 **CHEFFERY FORGES** for Drawing Bar Iron;
- 1 **ROLLING MILL** for Rolling Blooms into Bars and Plates;
- 1 **SAW AND 1 GRIST MILL**.

All within 300 Yards of the head of the spring. There are 2 large frame Coal Houses, and all other Buildings necessary, such as Shops and Houses for the workmen.

This Spring is one of the largest in Missouri, discharging at the lowest time 7,000 cubic feet of water per minute. The Ore Bank from which the Ore has been heretofore taken is about 600 yards from the furnace; it is the *Specular Iron Ore*, the best for making Bar Iron, and the quantity inexhaustible.—It is an Iron Mountain, 400 feet above the level of the Maramec River; the ore is entirely uncovered, and there is an easy descent and a good road from it to the furnace.

The lands have been carefully selected by one of the owners with a view to the interest and convenience of the Works, and are situated principally on the Maramec River and its tributaries, embracing the best bottom lands and water powers. The following detached tracts, comprized in the above quantity, were selected for the advantages they possess;

183½ ACRES in T. 40 N. of R. 8 W. in Sec. 3, near Wherry's Mill, in Osage Co.; entered to secure a very valuable Mill power on the Branca Spring and a good landing on the Gasconade River.

80 ACRES on Benton's Creek, 12 miles from the Works; entered to secure an extensive and valuable Ore Bank 2½ miles from the Maramec, at a point where there is ample water power.

320 ACRES in T. 38 N. of R. 4 W. in Sec. 22 and 23, affording an extensive and valuable water power on the Maramec river.

160 ACRES in T. 37 N. of R. 3 W. in Sec. 4, embraces two inexhaustible and valuable Ore Banks and is 1½ miles from Water power sufficient for a furnace and Grist Mill, and is distant 6 miles from the above site on the Maramec.

80 ACRES in T. 37 N. of R. 8 W. in Sec. 33, including an extensive bank of excellent Ore, and distant 1½ miles from water power on the waters of the Gasconade River, in Pulaski Co., sufficient for Furnace and Mills. All those Banks are of the same kind as the one at the Works, and deemed inexhaustible.

1 LOT, containing nearly one Acre, on the South Bank of the Missouri River, 4 Miles above the town of Hermann, purchased for a warehouse and

landing, and is one of the best landings on the River.

The lands above described are well timbered, and have been selected with a view to have an ample supply of wood and coal, for fences, building and other purposes. There are on the land valuable quarries of Limestone well adapted for Fluxes for the Ore, and also good quarries of Rock suitable for building. There are also on the land a great number the finest kind of Springs. A large portion of the lands are bottoms well adapted to the production of Corn and other crops. The Works are situated in a very pleasant and healthful part of the country. The Maramec ore is believed to be admirably adapted to the manufacture of steel.

A further description of the property at this time is considered unnecessary, as those wishing to purchase will no doubt view the property, which will be shown by the Agent, residing at the works.

The terms of payment required will be one-third of the purchase money in hand and the balance in three equal annual payments, secured by mortgage on all the property.

A more particular description of the property will be given, and further conditions of the sale made known, on the day of sale.

JNO. F. ARMSTRONG, Agent.

St. Louis, June 6, 1846.

The Louisville, (Ky.) Journal, Cincinnati Gazette, Tribune (Portsmouth, O.), Nashville Whig, Pittsburg Gazette, National Intelligencer, United States Gazette, (Phila.) Railroad Journal (N. Y.), and Boston Atlas, will publish the above once a week until the 20th day of October next, and send bills to this office for settlement, and mark price on first paper.

1823

**THE SUBSCRIBERS, AGENTS FOR**  
the sale of

Codorus,  
Glendon,  
Spring Mill and  
Valley, } Pig Iron.

Have now a supply, and respectfully solicit the patronage of persons engaged in the making of Machinery, for which purpose the above makes of Pig Iron are particularly adapted.

They are also sole Agents for Watson's celebrated Fire Bricks and prepared Kaolin or Fire Clay, orders for which are promptly supplied.

SAM'L. KIMBER, & CO.,

59 North Wharves,

Jan. 14, 1846. [1y4] Philadelphia, Pa.

**TO RAILROAD COMPANIES AND MANUFACTURERS** of railroad Machinery. The subscribers have for sale Am. and English bar iron, of all sizes; English blister, cast, shear and spring steel; Juniata rods; car axles, made of double refined iron; sheet and boiler iron, cut to pattern; tiers for locomotive engines, and other railroad carriage wheels, made from common and double refined B. O. iron; the latter a very superior article. The tires are made by Messrs. Baldwin & Whitney, locomotive engine manufacturers of this city. Orders addressed to them, or to us, will be promptly executed.

When the exact diameter of the wheel is stated in the order, a fit to those wheels is guaranteed, saving to the purchaser the expense of turning them out inside.

THOMAS & EDMUND GEORGE,

445 N. E. cor. 12th and Market sts., Philad., Pa.

**KEARNEY FIRE BRICK. F. W. BRINLEY,** Manufacturer, Perth Amboy, N. J. Guaranteed equal to any, either domestic or foreign. Any shape or size made to order. Terms, 4 mos. from delivery of brick on board. Refer to

James P. Allaire, } New York.  
Peter Cooper, }  
Murdoch, Leavitt & Co. }

J. Triplett & Son, Richmond, Va.

J. R. Anderson, Tredegar Iron Works, Richmond, Va.

J. Patton, Jr. } Philadelphia, Pa.  
Colwell & Co. }

J. M. L. & W. H. Scovill, Waterbury, Con.

N. E. Screw Co. } Providence, R. I.  
Eagle Screw Co. }

William Parker, Supt. Bost. and Worc. R. R.

New Jersey Malleable Iron Co., Newark, N. J.

Gardiner, Harrison & Co. Newark, N. J.

25,000 to 30,000 made weekly. 35 1y

**RICH & CO'S IMPROVED PATENT SALAMANDER SAFES.**

Warranted free from dampness, as well as fire and thief proof.

Particular attention is invited to the following certificates, which speak for themselves:

**TEST No. 10.**

*Certificate from Mr. Silas C. Field, of Vicksburgh, Mississippi.*

On the morning of the 14th ult., the store owned and occupied by me in this city, was, with its contents, entirely consumed by fire. My stock of goods consisted of oil, rosin, lard, pork, sugar, molasses, liquors, and other articles of a combustible nature, in the midst of which was one of Rich's Improved Patent Salamander Safes, which I purchased last October of Mr. Isaac Bridge, New Orleans, and which contained my books and papers. This safe was red hot, and did not cool sufficiently to be opened until 16 hours after it was taken from the ruins. At the expiration of that time it was unlocked, when its contents proved to be entirely uninjured, and not even discolored. I deem this test sufficient to show that the high reputation enjoyed by Rich's Safes is well merited.

S. C. FIELD.

Vicksburgh, Miss., March 9th, 1846.

*Certificate from Judge Battaile, of Benton, Mississippi.*

In October last I purchased one of Rich's Improved Salamander Safes, which was in the fire at the burning of my law office, and several adjoining buildings in this place, on the 17th of November last, at about half-past one o'clock A. M. of that day. The building was entirely consumed; and I take pleasure in stating that my papers in said safe were preserved without injury. A receipt book which was in said safe, had the glue drawn out of its leather back by the heat, and the back broken; but the leaves of the book, and the writing thereon, were entirely uninjured; and some of the writing which was of blue ink, was also left wholly uneffaced and not in the least faded. Said safe was by the fire heated perfectly red hot, and I do not hesitate to say, that said safe is a perfect security against fire. But the safe tumbled over during the fire, and being heated red hot, the outer sheeting of the door became pressed in, and the bolts of the lock bent, so that it could not be unlocked, and I had to have it broken open.

JOHN BATAILE.

Benton, Miss., December 27, 1845.

*Still other Tests in the Great Fire of July 19, 1845.*

The undersigned purchased of A. S. Martin, No. 138½ Water street, one of Rich's Improved Patent Salamander Safes, which was in our store, No. 54 Exchange place. The store was entirely consumed in the great conflagration on the morning of the 19th inst. The safe was taken from the ruins 52 hours after, and on opening it, the books and papers were found entirely uninjured by fire, and only slightly wet—the leather on some of the books was parched by the extreme heat.

(Signed,)

RICHARDS & CRONKHITE.

New York, 21st July, 1845.

One of Rich's Improved Salamander Safes, which I purchased on the 2d of June last of A. S. Marvin, 138½ Water street, agent for the manufacturer, was exposed to the most intense heat during the late dreadful conflagration. The store which I occupied, No. 46 Broad street, was entirely consumed; the safe fell from the 2d story, about 15 feet, into the cellar, and remained there 14 hours, and when found, I am told, and from its appearance afterwards, should judge that it had been heated to a red heat. On opening it, the books and papers were found not to have been touched by fire. I deem this ordeal sufficient to confirm fully the reputation that Rich's safe has already obtained for preserving its contents against all hazards.

(Signed,)

WM. BLOODGOOD.

New York, 21st July, 1845.

The above safes are finished in the neatest manner, and can be made to order at short notice, of any size and pattern, and fitted to contain plate, jewelry, etc. Prices from \$50 to \$500 each. For sale by

A. S. MARVIN, General Agent,

138½ Water st., N. Y.

Also by Isaac Bridge, 76 Magazine street, New Orleans.

Also by Lewis M. Hatch, 120 Meeting street, Charleston, S. C.

**CUSHMAN'S COMPOUND IRON RAILS.**

etc. The Subscriber having made important improvements in the construction of rails, mode of guarding against accidents from insecure joints, etc.—respectfully offers to dispose of Company, State Rights, etc., under the privileges of letters patent to Railroad Companies, Iron Founders, and others interested in the works to which the same relate. Companies reconstructing their tracks now have an opportunity of improving their roads on terms very advantageous to the varied interests connected with their construction and operation; roads having in use flat bar rails are particularly interested, as such are permanently available by the plan.

W. Mc. C. CUSHMAN, Civil Engineer,  
Albany, N. Y.

Mr. C. also announces that Railroads, and other works pertaining to the profession, may be constructed under his advice or personal supervision. Applications must be post paid.

**RAILROAD IRON AND LOCOMOTIVE**

Tyres imported to order and constantly on hand by A. & G. RALSTON

Mar. 20th 4 South Front St., Philadelphia.

**THE NEWCASTLE MANUFACTURING**

Company continue to furnish at the Works, situated in the town of Newcastle, Del., Locomotive and other steam engines, Jack screws, Wrought iron work and Brass and Iron castings, of all kinds connected with Steamboats, Railroads, etc.; Mill Gearing of every description; Cast wheels (chilled) of any pattern and size, with Axles fitted, also with wrought tires, Springs, Boxes and bolts for Cars; Driving and other wheels for Locomotives.

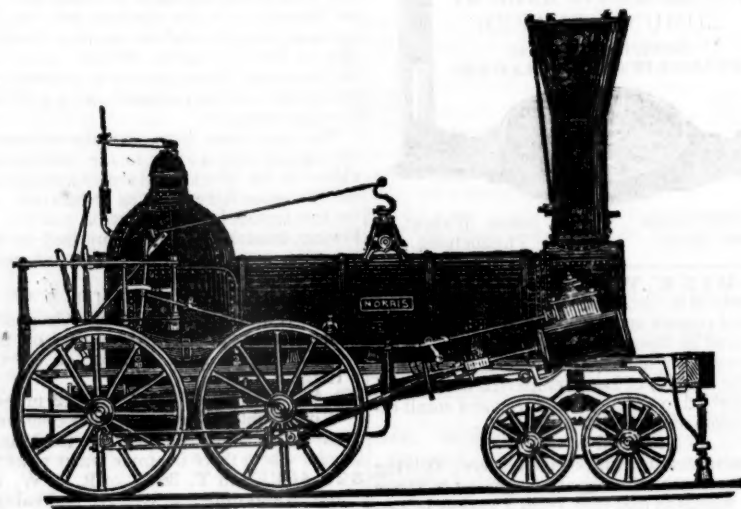
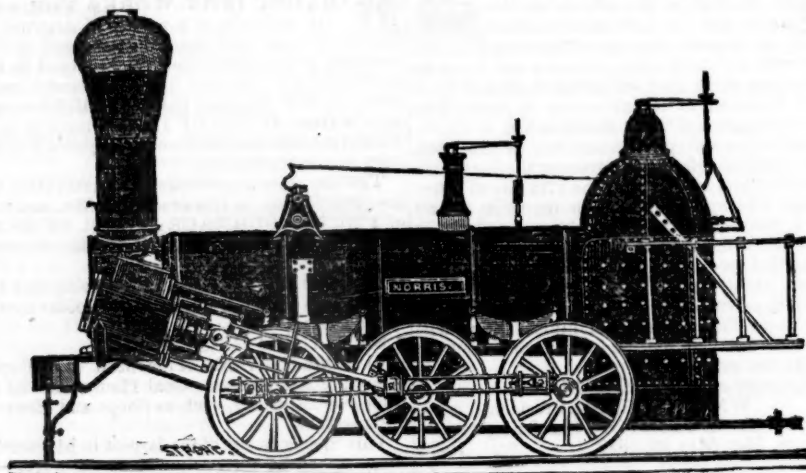
The works being on an extensive scale, all orders will be executed with promptness and despatch. Communications addressed to Mr. William H. Dobbs, Superintendent, will meet with immediate attention.

ANDREW C. GRAY,

a45 President of the Newcastle Manuf. Co.

## NORRIS' LOCOMOTIVE WORKS.

BUSH HILL, PHILADELPHIA, Pennsylvania.



**M**ANUFACTURE their Patent 6 Wheel Combined and 8 Wheel Locomotives of the following description, viz:

Class	1,	15 inches	Diameter of	Cylinder,	× 20 inches	Stroke.
"	2,	14	"	"	× 24	"
"	3,	14½	"	"	× 20	"
"	4,	12½	"	"	× 20	"
"	5,	11½	"	"	× 20	"
"	6,	10½	"	"	× 18	"

With Wheels of any dimensions, with their Patent Arrangement for Variable Expansion. Castings of all kinds made to order: and they call attention to their Chilled Wheels for the Trucks of Locomotives, Tenders and Cars.

NORRIS, BROTHERS.

**Atlantic and St. Lawrence Railroad.**

This company has advertised for proposals for 11 miles of road from Portland. Proposals to be received from June 17th to 27th, at Portland.

We cut a notice of this work from an eastern paper with the remarks; as to the unusual gauge we entirely agree, a gauge of five feet and a half is in use on no other road and is not likely to be used on any road connecting with them, it must therefore be intended to limit the whole traffic of the road to the through business and that immediately on the line.

"The Maine papers give us the substance of an agreement which has been entered into by the two companies established at Portland and at Montreal for connecting the two places by means of a railroad. The terms of the agreement appear to be judicious, and they indicate a spirit of mutual accommodation which augurs favorably for the success of the enterprise. The Atlantic termination is to be upon a wharf on the navigable waters of Portland harbor, and the St. Lawrence termination on a wharf on the St. Lawrence river opposite, or nearly opposite to the city of Montreal. The point of junction of the two roads is to be established at the boundary between the United States and Canada, by a commission to consist of three members to be appointed by each company. This point is not to be further west than Coaticooke river, and it is to be determined after full explorations and surveys shall have been made.

It is agreed that the railroad shall be constructed on a uniform plan throughout, of rails of uniform pattern and weight, and on a gauge of five and a half feet in the clear between the rails. This last article of agreement strikes us as an injudicious one, on account of the gauge adopted differing from that of nearly all, if not of all existing railroads, and the importance of uniformity.

The railroad may not immediately come into contract with any other work of the kind, but it is to be presumed that if it be accomplished, there will ultimately be occasion to connect it with other railroads both in Maine and in Canada.

It is agreed that the railroad shall be laid out six rods in width, and that the bed shall be formed, and the first track laid with a view of laying a second track, when the business shall be such as to require it.

**Principles of Railway Management.**

As we have never intentionally omitted an opportunity of furnishing to our readers accurate and useful information, in relation to "railroad management," and especially in relation to what we feel assured will promote immensely the utility of railroads to the masses, and increase their income to the shareholders, we will not now do so, and therefore devote a portion of this, and the two next numbers of the Journal to the subject of "railway management," as we are enabled to do by our esteemed friend in London, Mr. Gerard Ralston, who has so often favored us with important information, and whose philanthropy, is only surpassed by his devotion to the best interests of his countrymen.

We received by the Great Western, through the kindness of Mr. Ralston, a short treatise "on the principles of railway management, and on the profitable increase in the traffic produced by great reductions in the charges," by J. Butler Williams, Esq., F. S. S.,

F. G. S., read before the Statistical society of London, on the 16th of March last," which we shall lay before our readers in extenso, in the hope that it may be instrumental in producing the desirable result so confidently reported in the Trenton Gazette, as having already become matter of history. We merely give, in this number, the preliminary part of the authors remarks, but shall continue them in our next, and succeeding numbers.

The author says:

"When the first projects for railways to be worked with locomotive power were discussed and brought under public notice, it was anticipated that the chief source of profit would be found in the conveyance of goods and merchandize.

The unexpected and extraordinary increase in the number of passengers, however, produced by the combined economy of time and money, rendered the passenger traffic more immediately and evidently profitable; hence it naturally engrossed the attention of the managers whose entire energies were required to provide great accommodation, combined with speed, safety and regularity.

"So rapid has been the increase in the number of the passengers, increasing with every extension of the railway system, that a corresponding demand on the resources of companies, and the skill and energy of their managers, has caused the conveyance of goods to receive a less share of their attention than it merits, considering its importance in a commercial point of view, and as a source of profit to the capitalist.

"Of late the old established lines have increased the facilities for the carriage of goods, and provided accommodation apparently more nearly commensurate with the demand. So far as the experiment has been carried, it has shown generally that the net revenue from the goods traffic has been increasing in a quicker ratio than the net revenue from passengers.

"On the London and Birmingham, Grand Junction, and Great Western railways, the income from the goods traffic now ranges from 25 to 40 per cent., of that derived from passengers, the increase in the revenue from the goods traffic having been within twelve months about 30 per cent. on each of these great trunk lines.

"On the York and North Midland, the Paris and Rouen, the Paris and Orleans, and similar lines, the goods traffic now produces a revenue about equal to half of that derived from passengers, the increase having been in the same period about 30 per cent.

"Late arrangements made by the South Eastern company for the more economical and regular carriage of goods have caused an increase of revenue from that source of upwards of 100 per cent.

"Important as these facts are to show the advantages of a movement in the right direction, I am convinced that they do not represent even approximately, the vast increase in the goods traffic which must follow upon a liberal management and more extended accommodation.

"The inland transit of colonial produce, manufactured articles, and generally of valu-

able goods of small bulk, the relative value of which is but little enhanced by the expense of carriage, may be deemed to be secured for railroads, provided they offer the requisite accommodation.

"By a speedy and economical conveyance of small parcels, another field of enterprise and source of profit is opened to railways, without the possibility of competition by other modes of conveyance. I shall again refer to this branch of traffic, which I believe to have been too much neglected and effectually discouraged by irregular and high charges, either on the supposition that the returns would scarcely be commensurate with the additional trouble entailed, or from an erroneous view of its capabilities of expansion.

"But the most important field of all, because the most exhaustless, remains to this time greatly unoccupied by railways. I refer to the conveyance of agricultural produce and bulky materials, which are either conveyed by canals or common roads, or too frequently remain confined in districts where their value cannot be turned to the best public or private advantage.

"Coals and cattle are, it is true, carried to some extent by railway—but that this extent is insignificant as compared with the population to be supplied, although demonstrated by the returns of various railways, might be assumed upon simple reference to the tariffs which, except under peculiar circumstances, are too high, not only to encourage but actually to admit of their conveyance by railway with any benefit to the producers.

"Timber, marble, slate, building stone, lime, manure, minerals—also agricultural produce flour, etc., will follow the channel of railway transit only when the cost by this mode of conveyance shall have been brought to very low limits, corresponding in fact with, or lower than the charges of conveyance by canal.

"I propose investigating the problem of a highly economical carriage of goods, chiefly in relation to the profitable return that it is calculated to offer to the capitalist, by rendering much more productive the existing channels of railway communication. But although confining myself to that view of the question, I cannot be insensible to the great improvement that such a measure would effect in the commercial prosperity of districts, rich in natural and agricultural produce, but kept comparatively poor and unproductive from want of a cheap outlet. With diminution in the cost of conveyance, the producer derives in the first instance a corresponding increase in the net profit; afterwards this increase in the profit is shared, in varying proportions, between him and the consumer. The existence or non-existence of ready and economical outlets at once establishes a broad distinction between separate localities which individual energy and enterprise cannot obliterate. As regards the price of labor, the perfection of machinery, and even the skill of the workmen, the conditions of production may in most manufactures be made to assimilate. But individual enterprise cannot obtain at will an expeditious and economical means of transit; and districts otherwise favored,

may from its want remain barren and profitless.

"The interests of the public and the railway companies are fortunately identical; for the only way in which railways can return profits from the conveyance of heavy goods and bulky materials is by carrying them in great quantities; and quantity can be secured by no other means than an exceedingly low scale of charges. This I hope to succeed in establishing.

"A railway, with its complete establishment, may be likened to a great machine or engine adapted to purposes of transit. The original cost is considerable, and its object is to economize labor.

"The interest on the original cost is a most serious item which must be provided for.—The produce is costly, if but little work is performed; the produce is cheap, if the machine is fully and constantly employed. To allow the machine to be idle, or to work with incompetent action, is to incur an accumulating loss for interest on the unproductive capital.

"The cost of all conveyance on railways admits of being separated into two distinct elements:

"1st. The interest on the capital—together with certain fixed charges which are independent of the greater or less use made of the railway.

"2dly. The working expenses resulting directly from the work done.

"The first of these elements, viz: that consisting of the fixed charges, is not composed solely of the interest on the capital expended, but embraces also the cost of repairs of stations, goods, sheds fencing, slopes of embankments and cuttings, drainage, renewal of sleepers, (in part) and generally such works as are essential to prevent the deterioration of the property, and are not influenced by the greater or less traffic of the line.

"It embraces also a certain proportion of the expenses of management, salaries to secretaries, officers, police, and others, who, although they may be increased in number with an increase in the traffic, are not increased in proportion to the extension of the traffic.

"The second element embraces the cost of haulage, properly speaking, that is, repair and maintenance of engines, trucks, carriages, etc.; consumption of fuel, oil, grease, etc.; wages of engine driver, stokers, guards, porters, etc.; maintenance of the permanent way in so far as it is affected by the traffic; and proportionate increase in the number of managing officers, superintendents and workmen, in as far as that increase is required by additional traffic.

"The first element varies with every railway according to the character of the country traversed, the traffic to be provided for, the views of the directors, the skill of the engineer, etc.

"The average cost of railways has been:

	Per mile.
In England about.....	£31,000
In Scotland ".....	22,000
In Ireland ".....	22,000

(Vide Porter's 'traffic returns,' Statistical journal, vol. vii, p. 176.)

In Belgium about..... 18,000  
(Vide 'report of the statistical bureau,' Delaveleye, Brussels, 1844.)

In France about..... 41,000  
(Vide Claudel's 'Aide-Memoire des Ingenieurs,' p. 455. Average of 5 Metropolitan lines.)

"The great difference to be noticed in the above statement of the average cost of railways in different countries, is not greater than the difference which will be found to exist between the cost of different lines in the same country. The causes of such differences can easily be traced, but they need not be considered in connection with the subject under examination.

"It is manifest, however, that the fixed charge which must enter as so influential an element in the cost of conveyance, will, in any comparison which we may institute, be greatly modified according to the cost per mile taken as the basis of the calculation, and greatly so likewise according to the rate of interest which may be attributed as due to the capital risked.

"As variable opinions must necessarily prevail on both points, I propose to offer tabular statements of the effect of the fixed charge on the cost of conveyance, prepared on varied assumptions.

"In the first instance, however, I shall confine my attention to the lowest of these estimates, because the opinions of engineers and of statisticians agree in establishing that the lines to be henceforth constructed will on the average approach more nearly to the lower than the higher standard. 'The board of trade in their report on the Southwestern district, in 1845, state that the lines proposed to be made in that part of the country might be constructed for about £12,000 per mile—and the estimated cost of the mass of new railways, projected during the last two years, ranges, with few exceptions, between £25,000 and £10,000 per mile.'\*

"Perfectly responsible contractors are ready to undertake contracts for the works on the engineers' estimates. I believe therefore that illustrations, taking the Belgian average as the standard of cost, will be applicable to lines proposed to be made.†

"I propose taking the rate of interest at 5 per cent. per annum, and at 10 per cent.

"Upon the original cost of \$18,000 per mile, a first demand, if the rate of 5 per cent. interest be selected, of £900 per mile per annum must be provided for out of the revenue from the traffic, being in nowise modified by the extent of the latter.

"To this must be added the aggregate annual outlay for those items which have been enumerated above, as being independent of the traffic, such as the maintenance of the boundary walls and fences, the repairs

\* 'Defects of the English system of railway legislation,' by Jas. Morrison, Esq., M. P., Longman, 1846, p. 13.

† This assumption as to the cost of construction will not probably be applicable, if the numerous projects now before parliament be carried into execution in the next three or four years. The great demand for labor and materials would, in such a case greatly raise their prices above the existing averages, and certainly cause a departure from the estimates of even the most experienced and skillful engineers.

of the buildings, maintenance of the slopes of cuttings and embankments, drainage, etc.

"I have not been able to obtain for the English railways a return of these items sufficiently comprehensive for general deductions, but for the Belgian railways, an examination of nine years' working has enabled the statistical bureau to determine the average as amounting to £130 per mile per annum, to be added therefore to the interest, and producing (at 5 per cent.) a fixed charge of £1030 per mile per annum, to be defrayed by tolls on the carriage of passengers and goods.

"At 10 per cent. interest this fixed charge will be:

Interest on £18,000.....	£1,800
Other fixed charges.....	130
Total.....	£1,930

"This fixed charge is to be provided for as a whole by the revenue from the goods and passenger traffic. As I am at present considering only the conveyance of goods, I must strike a proportion to determine the share to be allotted to each branch. In determining this ratio, the proportion of the average returns from goods and passengers might be taken, thus making the charge to be given to the goods' branch comparatively smaller than that apportioned to the passenger branch; but inasmuch as the aim of this essay is to show that the carriage of goods is destined to have an importance little, if at all inferior to that now belonging to the conveyance of passengers, I propose, in the investigation, dividing this fixed charge equally between the two classes of traffic.

"The tolls on goods must return therefore over and above the actual cost of haulage, an annual revenue per mile of £515 at 5 per cent., and £965 at 10 per cent. Distributing this over the tonnage throughout the year, if the mean amount of goods traffic be on the average per mile per annum 20,000 tons, the charge per ton per mile must be:

At 5 per cent.  $\frac{£515}{20,000}$  or 6-18d.

At 10 per cent.  $\frac{965}{20,000}$  or 11-58d.

"If the traffic be increased to 40,000 tons per mile per annum, the charge per ton per mile becomes:

At 5 per cent.  $\frac{£515}{40,000}$  or 3-09d.

At 10 per cent.  $\frac{965}{40,000}$  or 5-79d.

"If the traffic be raised to 200,000 tons per mile per annum, the charge per ton per mile would then be:

At 5 per cent.  $\frac{£515}{200,000}$  or 0-618d.

At 10 per cent.  $\frac{965}{200,000}$  or 1-158d.

In short, this constant charge of £515, at 5 per cent., or £965, at 10 per cent., becomes a charge on the carriage of each article, varying in the inverse ratio of the amount of traffic.

"The second element, however, the cost of haulage or working expenses, must be added to obtain the total charge per ton per mile.

"In endeavoring to ascertain the general average cost of the actual haulage, and other expenses dependent on the working of the lines, I have found very great variations in different lines, due in a great measure, no doubt, to the returns embracing different items of expenditure, as well as to the difference in the cost of fuel and other materials. The most complete returns to which I have had access, are those published by the statistical bureau of Belgium, for upwards of two years previous to January, 1844.

"If it be found, as I believe it will, when access is had to more complete information, that the English scale of working expenses is less per ton per mile than that of Belgium, the reasoning which follows will not be thereby vitiated, the conclusion will only become more manifest.

"The average working cost in Belgium has been on goods trains 45d. per ton net per mile.

"The fixed and variable charges combined will then give the total cost, according to the amount of tonnage, as follows, viz:

"If the traffic be 20,000 tons per mile per annum,

1. At 5 per cent. interest } £515  
on capital charge vary- } 20,000 = 6-18d.  
ing with the traffic, }  
+ Haulage charge (fixed) = 45d.

Total per ton per mile, 6-63d.

2. At 10 per cent. per annum, charge varying } £965  
with the traffic, } 20,000 = 11-58d.  
+ Haulage charge (fixed) = 45d.

Total per ton per mile, 12-03d.

"With a traffic of 200,000 tons per mile per annum,

1. At 5 per cent. interest, charge varying } £515  
with the traffic, } 200,000 = 6-18d.  
+ Haulage charge (fixed) = 45d.

Total per ton per mile, 1-068d.

2. At 10 per cent. interest, charge varying } £965  
with the traffic, } 200,000 = 1-158d.  
+ Haulage charge (fixed) = 45d.

Total per ton per mile, 1-608d.

"The comparison is carried out more in detail in the annexed table.

"In Belgium, at the time to which the returns determining the working expenses had been brought, viz: the end of 1843, the quantity of goods carried on the government lines averaged 40,000 tons per mile per annum. —At that time the actual average charge throughout the Belgian railways was 2½d. per ton per mile. But a reference to the table shows that with the average traffic of 40,000 tons per mile per annum, the charge required to produce 5 per cent. interest on the capital would be 3-54d. Hence, on every ton of merchandize, which was then conveyed on the Belgian railways (assuming that half the interest on the capital should be borne by the passenger and half by the goods

traffic) there was a positive loss of upwards of 1d. per ton per mile.

"This conclusion deduced from the table, is borne out by the returns officially issued from the statistical bureau, which show the Belgian government railways to have been worked at a loss since their establishment. — (Delaveleye's report, Brussels, p. 25.)

"The yearly loss may be calculated thus:

Table showing the diminution in the cost of carriage per ton per mile, dependent on the increase in the traffic. (Original cost of construction, £18,000 per mile.)

Allowing interest at the rate of 5 per cent. per annum on the capital.

Average traffic per mile per annum. Tons net.	Fixed charge per ton per mile for interest, etc.	Actual working expenses per ton per mile.	Total Charge.
	d.	d.	d.
20,000	6-18	.....	6-63
30,000	4-12	.....	4-57
40,000	3-09	.....	3-54
50,000	2-47	.....	2-92
60,000	2-06	.....	2-51
70,000	1-76	.....	2-21
80,000	1-54	.....	1-99
90,000	1-37	45	1-82
100,000	1-24	.....	1-69
150,000	82	.....	1-27
200,000	62	.....	1-07
300,000	41	.....	86
400,000	31	.....	76
500,000	25	.....	70
1,000,000	12	.....	57

Allowing interest at the rate of 10 per cent. per annum on the capital.

	d.	d.	d.
20,000	11-58	.....	12-03
30,000	7-72	.....	8-17
40,000	5-79	.....	6-24
50,000	4-63	.....	5-08
60,000	3-86	.....	4-31
70,000	3-31	.....	3-76
80,000	2-89	.....	3-34
90,000	2-56	45	3-01
100,000	2-32	.....	2-77
150,000	1-54	.....	1-99
200,000	1-16	.....	1-61
300,000	77	.....	1-22
400,000	58	.....	1-03
500,000	46	.....	91
1,000,000	23	.....	68

"At per mile, 40,000 times the excess of 3-54d. above the actual charge of 2-5d. per ton per mile (40,000 being the annual tonnage per mile.)

"Or  $40,000 \times 1-04d. = £173$ .

"To be multiplied by 350 miles of road then at work,  $£173 \times 350 = £60,000$  yearly loss.

"Such a result, viz: the loss which has been thus deduced by the theoretical investigations is not more unfavorable than that which (up to the date of the report referred to) had attended the working of the Belgian government railways, viz:

"That after defraying the expenses, a surplus was left only sufficient to pay interest on the capital at the rate of 2½ per cent. And as the money for the construction of the Belgian railways has been borrowed by the state at 5 per cent. interest,\* the country must provide by an annual tax for the deficiency of 2½ per cent. shown in the working.

"It is true that this 2½ per cent. cannot al-

\*The interest is exactly 4-86 per cent. per annum, being the mean on various loans raised at different rates.

together be considered as a money loss, inasmuch as the railways afford free transit for government despatches, for the post-office, for military stores and ammunitions, soldiers on duty, and other demands for the public service. But all these form in the aggregate but a small part of the per centage to be provided for to meet the deficit arising from the working of the lines.

"There is no doubt that Belgium has indirectly been benefited by the introduction of railways to an extent which can scarcely be over estimated, but I believe that a difference made in the principle of working the lines and the system of their management would have the effect of giving profits where loss is now incurred.

"The inspection of the above table in which is shown so rapid a diminution in the remunerating charge consequent on the increase of traffic, points to the guiding principle in the management of a railway.

"I have stated that the average tonnage of merchandize had been only 40,000 tons per mile per annum on the Belgian railways. — Now at that very time (Delaveleye, Brussels, 1844,) the average tonnage per mile per annum was, on the canals of Belgium, 400,000 tons, or ten times the quantity carried by railway. It is impossible that so marked a disproportion as this can be due to any actual inferiority in railways for the carriage of goods. The chief cause of the disproportion is the difference in the charge, which on the canals averaged 1½d. per ton per mile, or one-half of those by railway. On the contrary I believe, on the side of railways, the advantages of a speedy and certain delivery, uninterrupted by frost or by drought, are so great, in a commercial point of view, that not only can they compete with canals, but that they must ultimately supersede them, if they offer, in addition to the above advantages, that of an equal degree of economy. There can be little doubt that the railways of Belgium could by a system of low fares and proper accommodation to commercial men, have divided with the canals that traffic of 400,000 tons; but without even encroaching upon the canal traffic, new traffic would have been created by a system of low fares.

"Assuming however, that by holding out every legitimate encouragement to commercial men to send their goods by railway, the traffic had been per mile per annum 200,000 tons instead of 400,000, charged at the canal rates of 1½d., this branch of the railway traffic would have been a source of profit instead of loss.

"The table gives as the charge required to pay 5 per cent. interest with a traffic of 200,000 tons, - - - 1-07d. per ton per mile. Assumed toll, - 1-25d. " " "

Profit, - - - 18d. " " "

"Which on 200,000 per mile per annum, produces £150.

"And for 350 miles of road then at work, £52,500.

While the public would thus have been benefitted by the more economical carriage of their goods,

the difference in the revenue would have been, - profit, £52,500 instead of - loss, 60,100

Or a positive difference in the annual revenue to the state of total, £112,600 That is, upwards of 1½ per cent. per annum on the total capital expended, viz: £6,300,000

"It will be useful to apply the test of this table to the working of various English lines.

"I have collated from a pamphlet entitled *Twenty Short Reason for Railways being Carriers of Goods*,\* the following table showing the rates charged for goods conveyed by 20 of the principal lines in England, at the date of the publication of the pamphlet.

"Dividing them into classes of goods forwarded by the companies as carriers and of goods forwarded by intervening carriers, and subdividing these again into heavy and bulky goods, such as grain, iron, timber, coals, etc., and into light goods, such as manufactured articles, colonial produce, etc., the average on the heavy and bulky goods is somewhat less than 2½d., ranging from 1d. to 5d., and on light goods about 5½d. on the average, ranging from 4d. to 8d. for railways that are their own carriers.

"The charges are higher on goods forwarded by intervening carriers.

"The general average on all classes of goods in these 20 railways, is 5½d. per ton per mile.†

#### COMPANIES THEIR OWN CARRIERS.

Length in miles.	Name of Railway Company.	Rates charged: Minimum as for grain, iron, timber; Maximum as for light goods in general, excluding cartage.
118	Great Western.....	2-3d. to 4-9d.
98	Grand Junction.....	1-8d. to 4-9d.
77	South Western.....	3-7d. to 5-2d.
61	Newcastle and Carlisle.....	1-9d. to 4-9d.
53	Birmingham and Gloucester..	1-4d. to 6-8d.
52	London and Brighton.....	3-0d. to 6-9d.
51	Eastern Counties.....	3-5d. to 8-2d.
46	Edinburgh and Glasgow.....	1-3d. to 4-5d.
42	Birmingham and Derby.....	1-7d. to 4-3d.
31	Liverpool and Manchester.....	2-9d. to 5-4d.
31	Manchester and Birmingham..	2-5d. to 3-9d.
22	Glasgow and Greenock.....	2-2d. to 5-4d.
20	Preston and Wire.....	5d. to 6d.
Average.....		2-4d. 5-5d.

#### GOODS FORWARDED BY INTERVENING CARRIERS.

112	London and Birmingham.....	3-2d. to 7-5d.
88	South Eastern.....	2-4d. to 6-8d.
72	North Midland.....	4-2d. to 8-3d.
60	Manchester and Leeds.....	4d. to 8d.
45	Great North of England.....	4d. to 8d.
22	North Union.....	5-4d. to 16d.
29	Lancaster and Union.....	6d. to 18d.
Averages.....		4-2d. 10-4d.

The comparison of this table of actual charges made on English railways, with the table of remunerative charge, will bring out some interesting results. The conclusions,

\*Liverpool, Waring Webb, Castle street, 1845.

†Since the publication of the pamphlet referred to and even within the last few weeks, great reductions have been made in the charges of several of the great trunk lines.

however, will be less open to objection, if the comparison be instituted with a table prepared on the average cost of the existing English railways, viz: about £31,000 per mile, with allowances of 5 and 10 per cent. interest thereon respectively.

£31,000 at 5 per cent. requires.....	£1,550 per mile per annum.
Other fixed charges (as before).....	130 " "
Total charge required per mile per annum to produce five per cent. interest.....	1,680 " "
The same at ten per cent. on £31,000 =	3,100 " "
Other fixed charges....	130 " "
Total.....	£3,230 " "

"To be equally divided, for the reason before adduced—

Return required from the goods traffic. { at 5 per cent.....£840	
Ditto. { at 10 per cent.....£1,615	
passenger traffic. { at 5 per cent.....£840	
{ at 10 per cent.....£1,615	

Table showing the diminution in the cost of carriage per ton per mile, consequent on the increase in the traffic. (Original cost of construction £31,000 per mile.)

Allowing interest at the rate of 5 per cent. per annum on the capital.

Average traffic per mile per annum. Tons net.	Fixed charge per ton per mile for interest, etc.	Actual working charge per ton per mile.	Total charge.
	d.	d.	d.
20,000	10-08	.....	10-53
30,000	6-72	.....	7-17
40,000	5-04	.....	5-49
50,000	4-03	.....	4-48
60,000	3-36	.....	3-81
70,000	2-88	.....	3-33
80,000	2-52	.....	2-97
90,000	2-24	.....	2-69
100,000	2-03	.....	2-47
150,000	1-34	.....	1-79
200,000	1-01	.....	1-46
300,000	-67	.....	1-12
400,000	-50	.....	-95
500,000	-40	.....	-85
1,000,000	-20	.....	-65

Allowing interest at the rate of 10 per cent. per annum on the capital.

	d.	d.	d.
20,000	19-38	.....	19-83
30,000	12-92	.....	13-37
40,000	9-69	.....	10-14
50,000	7-75	.....	8-20
60,000	6-46	.....	6-91
70,000	5-53	.....	5-98
80,000	4-84	.....	5-29
90,000	4-31	.....	4-76
100,000	3-87	.....	4-32
150,000	2-55	.....	3-00
200,000	1-93	.....	2-38
300,000	1-29	.....	1-74
400,000	-96	.....	-1-41
500,000	-77	.....	-1-22
1,000,000	-38	.....	-83

"In the above table, I have taken the working charge per ton per mile of goods at 45d. the same as the Belgian experience. I believe that the greater cheapness of coke in this country, and the superior mechanical skill, must reduce the actual locomotive expenses much below those of Belgium. But against that may be set the taxes and rates, and other charges, from which railways in Belgium are exempt—as also the greater speed kept up in this country.

To be Continued.

**Telegraphic Joke.**—The Washington correspondent of the Pennsylvania Inquirer says that a few evenings since in Baltimore, the people were anxiously waiting for news from the army, and there being none to send, the operator at the Washington line sent on letter by letter—"T-h-e-r-e-a-r-e-a-g-r-e-a-t-m-a-n-y-M-e-x-i-c-a-n-s"—here there was a full stop, and the Baltimore operator made signs to proceed. The Washington operator did so, and ended the sentence with the words "i-n-M-e-x-i-c-o." A great rattling followed from the Baltimore end of the line, as much as to say—"when I come on I'll pitch into you like a thousand of bricks."

**Atlantic and St. Lawrence Railroad.**—We learn that the directors of the Atlantic and St. Lawrence railroad have located the road from fort Burroughs, [Turner's ship yard] to the east side of Royal's river, in north Yarmouth, passing round upon the east side of Munjoy's hill, keeping on the west side of Presumpscut bay, and crossing Presumpscut river immediately below the covered bridge. Proposals for contracts will be received for the grading, masonry and bridging of the first division, at the engineer's office, till the 27th inst.

We learn that the directors have unanimously voted to break ground on the 4th of July next.

The surveys from Royal's river to the Little Androscoggin, we are told are to be in progress as soon as the plans, profiles, estimates and specifications of the first division are completed.—*Portland Advertiser.*

**Northern Railroad.**—The directors of the company held a meeting at Boston, on the 16th inst., and resolved to prosecute the work with vigor. Col. Charles L. Schlatter, now in the service of the general government, and formerly favorably known as engineer on several eastern railroads, and for several years engaged in the construction of the public works of Pennsylvania, was elected chief engineer.

A committee of directors, consisting of Gov. Paine, of Vermont, and Messrs. Reed and Lewis, of Boston, has been appointed, with full power to contract immediately for 12,000 tons of iron rails for the road.

Another committee, consisting of the president and two local directors, has been appointed, who are charged with carrying forward the surveys, etc., for the immediate construction of the work as soon as contracts can be reasonably made.

We congratulate our fellow citizens of St. Lawrence, Franklin, Clinton and Essex, that their long deferred hopes are now to be fully realized.—*Albany Journal.*

**Norwich and Worcester Road.**—It is stated that it is not intended to declare a dividend upon this stock until January next, and the directors expect from that time regular semi-annual dividends will be earned and declared. For the past year the net earnings have been, it is said, 5 per cent. and the local business is steadily increasing.—*Worcester Trans.*

**Little Miami Railroad.**—There is a rapid increase of business on this road, and eventually it must become the main route of eastern travel from the west and southwest. In a few weeks it will be open to Springfield, the termination of this road where it intersects with the Mad river and lake Erie railroad.

The summer arrangement is now completed, connecting at Sandusky city with a daily line of steamboats to Buffalo, so that travellers meet with no detention. Two passenger trains leave Cincinnati daily, one at 9 a. m., and the other at half-past one p. m. Passengers by the morning train sup and sleep at Columbus, and reach the lake the next afternoon; by the afternoon train, passengers are taken directly through to the lake in 28 hours. The fare through to Sandusky city is but \$8—and to Buffalo, N. Y., \$14.—*Cincinnati Gazette.*

**Pennsylvania Railroad.**—The books of subscription to the capital stock of the Pennsylvania railroad company, were opened yesterday at the Philadelphia Exchange, and the sum of 300,000 dollars in stock was taken by 57 subscribers, the subscriptions ranging from 400 down to 3 shares, which we regard as very good indeed, for the first day, but we look to-day for a larger subscription. There cannot exist a doubt but that the whole of the required stock will be speedily subscribed.—*Pennsylvania.*

Correspondents will oblige us by sending in their communications by Tuesday morning at latest.

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### AMERICAN RAILROAD JOURNAL.

PUBLISHED BY D. K. MINOR, 23 Chambers street, N.Y.

Saturday, June 27, 1846.

**THE RAILROAD JOURNAL** will hereafter be published *simultaneously* in NEW YORK and PHILADELPHIA. The editorial department will as heretofore, be under the direction of the subscriber, aided by his former associate Mr. George C. Schaeffer, and other gentlemen of ability connected with the profession—and renewed efforts will be made to render it *more* worthy of the rapidly increasing support which it is now receiving.

Engravings and illustrations will be more frequently given, and expensive maps will be occasionally prepared, showing the progress of the railway system, one of which, showing the proposed route of steam communication from China, across the isthmus, and through the United States, to England, by Edward McGeachy, Esq., of Jamaica, is now in the hands of the artist, and will be ready in a few weeks; and others will follow.

The office in NEW YORK will remain for the present, at 23 Chambers street, and be in charge of Mr. Egbert Hedge, long connected with the work—who is authorized to transact business for me.

The office in PHILADELPHIA will be at the FRANKLIN HOUSE, 105 Chestnut street, under the direction of the editor and proprietor, where all *letters* and *communications* by mail, and all *exchange papers* and *periodicals* may be hereafter addressed to

D. K. MINOR.

The editor of the Railroad Journal presents his compliments to his numerous subscribers and friends and assures them that he will be always gratified to see them at his new office and home, the FRANKLIN HOUSE, late SANDERSON'S, 105 Chestnut street, Philadelphia. He will be found at home.

### Maramec Iron Works for Sale.

By the advertisement in the Journal, it will be seen that these extensive works, in Crawford co. Mo., are for sale. They are situated about ninety miles in a southwesterly direction from St. Louis, and from the accounts we have of them, they are well worthy of the attention of those who desire to invest capital in the iron trade in that region.

### Investigation of M. Boutigny on the Explosion of Steam Boilers.

So much has been said upon this subject, and men of so great ability have investigated it, that it would seem that but little remained to be said or done in regard to it. There are some points, however, which have always appeared unexplained, and it is precisely these which have received new light from the investigations of M. Boutigny on what he calls the spheroidal state of water.

Every one is familiar with the common test of the

heat of smoothing irons, and most persons too have noticed the singular behavior of water when thrown in drops upon a very highly heated stove. Philosophers had ascertained that under these circumstances the evaporation of water was less than when boiling at a lower temperature, and something like the true cause assigned—but no determination of the laws of water in this peculiar condition had ever been made until the thorough examination of M. Boutigny. Before giving the general results obtained by him, we shall state a few of the more important circumstances attendant upon this condition of water; and such as may be simply and readily verified by experiment.

If we heat sharply a small metallic vessel, either a silver or platinum crucible, or even a silver spoon, over a lamp, and throw into it a drop of water, the drop instead of boiling, instantly assumes a spheroidal form, and sometimes flies about the vessel rapidly, at others, whirls around an axis with extreme velocity, or appears to remain perfectly quiet. If the heat has been great, or if the vessel is kept over the lamp, the drop retaining its spheroidal form gradually diminishes in size or finally disappears—but if the vessel cools rapidly, or is withdrawn from the source of heat—the water suddenly flattens down, boils with violence, and is almost immediately converted into steam. If we compare the time taken by the evaporation of water in this last, its ordinary condition, and that consumed in the disappearance of the sphere, we shall find that at the very high temperature the evaporation of water is vastly slower than at 212°, the ordinary boiling point.

It is evident that water in the spheroidal state does not wet the vessel, and if by raising the latter to a red heat we bring a considerable quantity of water to the peculiar condition, we readily ascertain the fact by the rounded surface of the water and by the reflection of the light of a candle from the bottom of the mass.

These are a few of the more obvious appearances. The results of the whole investigation are the following:

I. The lowest temperature at which any notable quantity of water can assume this condition is 288 degrees Fahrenheit.

II. That water, in the spheroidal state, evaporates more rapidly as the temperature of the vessel is increased, but at 392 deg. is *fifty times* slower than by boiling in its ordinary condition.

III. That the temperature of water [as well as any other body,] in the spheroidal state, no matter how high that of the containing vessel may be, is invariably and always less than its boiling point, being in the case of water, a little under 206 deg.

IV. That in this condition, the vapor given off is equal in temperature to the containing vessel—or, in other words—the equilibrium of heat between the vapor and vessel is maintained, but not between the vessel and the water.

V. That water, and all other bodies in the spheroidal state, possess the power of totally reflecting heat.

VI. That there is no contact between the liquid and the vessel.

M. Boutigny is of opinion that the class of explosions denominated *fulminating*, may be referred to this cause, and among other examples cites those of the Butterfly on the Delaware in 1839, and of the Mohican on the Mississippi in 1842. He has proved that large quantities of water can assume this condition at temperatures by no means high—that a portion of the water in a vessel can be thus influenced, and communicate the condition gradually to the

whole mass if the temperature is sustained. Here, then, we have the very elements of destruction—a large body of water giving off but little steam, and deceiving one into the belief that there is little or no water in the boiler. Cold water is admitted—the temperature of the boiler reduced until the water is brought to its ordinary condition, when it instantly is converted into steam, and no boiler can withstand the pressure suddenly reached. The very opening of a safety valve may, by throwing the water into violent ebullition, cause a momentary separation between the liquid and the highly heated sides of the boiler, and however short this interval may be, it may be long enough to produce the degree of heat at which water enters the spheroidal state; the instant the water returns, the equilibrium between the boiler and the water is no longer maintained, and the whole mass may be thrown into this peculiar condition.

The "jumping" of the water in a boiler by suddenly opening a valve is known to all; and in tubular boilers it is not very rare that the water should be entirely driven out of the lower part of the space between the tubes. The heeling of a steamboat may cause a portion of the boiler to become heated to such a degree, that when the boat rights, the water, coming in contact with a highly heated surface, assumes the spheroidal condition, and the explosion, although already prepared, may be deferred until the introduction of cold water, or the cooling of the boiler.

It would be useless to attempt to specify the great number of cases in which this state of things might occur, as any person conversant with the subject could easily make the application of the principles laid down.

It is curious that in this condition of water, if the iron be heated to about a red heat, decomposition takes place, and hydrogen gas is formed in considerable quantities, and this, on coming in contact with the air, must undoubtedly increase the violence of the explosion.

The remedy for the evil in this, as in everything else, consists rather in prevention than in cure. A rough surface is found unfavorable to the spheroidal state, as also salts contained in the water. As any artificial roughening, or the fastening of points, etc., would prevent the cleaning of the boilers, M. Boutigny proposes the insertion of loose spirals or coils of iron. These would be more effectual if made of angular, than of round wire. The boilers heated from beneath are considered the most liable to this sort of accident. We may add that in tubular boilers the space between the tubes should never be so small as to allow the bubbles of steam to drive the water from any considerable portion of highly heated surface.

If the water has already reached the spheroidal state, the only remedy is to urge the fire, stop the engine, empty the boiler as rapidly as possible, and then extinguish the fire—a proceeding which must undoubtedly injure any boiler, but far preferable to an explosion. Should it be necessary to keep in motion, as in a vessel in currents or near rocks, M. Boutigny advises to urge the fire, and allow only small quantities of water to enter at a time, gradually feeding until the water returns to its proper state.

We trust that the interest of the subject will be an excuse for trespassing so long upon the patience of our readers, and that our endeavors to make the matter comprehensible may have proved successful, as the original memoirs are far too long to be either translated, or even formally abridged.

**Kyanizing Timber.**

We have received from Mr. Herron, the following statement of D. Chaloner, in relation to his examination of specimens of timber, prepared with mercury—or as it is more frequently termed “Kyanized,” which had been used as a cross-tie, or sill, on the Baltimore and Susquehanna railroad for several years.

We have now in our possession a specimen of the stick, upon which the experiment was made, by Dr. C., in a state of as perfect preservation as if cut only six months ago, which may be seen at all times.

PHILADELPHIA, January 18th, 1843.

JAS. HERRON, Esq., Civil Engineer.

Dear sir: At your request I examined a small portion (say five grains,) of wood taken from the heart of a “Kyanized sleeper laid in August, 1838, and taken up in August, 1843,” and detected by chemical agents the presence of corrosive sublimate, (bichloride of mercury,) in large quantities in the specimen exhibited. Five grains of the wood were boiled in a weak solution of muriatic acid and water, until the wood was taken up, a portion of the solution thus obtained was placed in a vessel into which the poles of a small galvanic battery entered, in a few moments, bubbles of gas were disengaged from the solution and the mercury appeared at the positive pole of the battery.

The presence of the mercury being so easily shown in so minute a quantity as five grains, proves that it exists in excess in the “mineralized wood.”

The sleeper externally is of a whitish color, hard and firm in its texture, and difficult to cut with a knife.

I have thus hastily given you the results as you are pleased to call them, of my experiments on the “mineralized sleeper”—and when you receive more specimens, will be pleased to make further examinations in this important subject. Very respectfully yours,

A. D. CHALONER, M. D.,

**Canal in New Grenada, and Railroad across the Isthmus of Darien.**

The following letter, from our esteemed London correspondent, breathes the right spirit. It gives the views of an enlightened and liberal American, residing long among, and associating freely with, intelligent foreigners; and directs the attention of his countrymen to a subject of vast and absorbing interest—a subject, indeed, which has attracted the attention of several of the European governments. We concur fully with the writer, that the work can be done more speedily, and much cheaper, by our American, than by foreign engineers; and we know none more competent to undertake it, or more likely to carry it through if undertaken, than the gentlemen named by the writer, because they are familiar with the language, manners, and customs, and possess the confidence of the people, of New Grenada, and have become in a measure acclimated to those regions.

We are very desirous to obtain the information referred to, and therefore much regret that we did not meet with Mr. Totten before he left this city.—We shall however endeavor to see him, and thus be able to furnish our readers with many interesting facts in relation, not only to the proposed work, but also to that on which he and Mr. Trautwine are engaged.

No. 21 TOKEN HOUSE YARD, LONDON. }  
May 27th, 1846. }

D. K. MINOR, Esq.,

My dear sir: I take advantage of our countryman, Mr. Totten's, return from South America to North America, via London, to write you a few

lines. This gentleman is engaged in a most important work in New Grenada, viz: the construction of a navigable communication between the port of Carthagena and the river Magdalena, the particulars of which I strongly urge you to procure from him, as I am convinced you will feel a deep interest in his enterprise. After the completion of the important work in which he is engaged, I hope he and his associate, Mr. Trautwine, of Philadelphia, will have established so good a reputation for integrity of character, as well as for skill and efficiency as engineers, that the government of New Grenada will give them the vastly important work to do, of making a cheap American railway across the Isthmus of Darien, between Porto Bello and Panama, so as to carry merchandize and passengers from the Atlantic to the Pacific in two or three hours. I want Americans to have the honor of making this vastly important work—indeed they are far more competent than English or French engineers, to make, in a rapid and economical manner, a railway sufficiently good and suitable for all practical purposes for the next 20 years' use. An English or a French engineer would spend four or five times as much as he ought in making a road across this wild country, while these practical American engineers, Messrs. Totten & Trautwine, would make a suitable road in the American fashion, without ornaments or embellishments, or superfluity of any kind, with a single track, for \$20,000 or \$25,000 per mile, which would answer all the purposes required, until by having established the channel of trade and travel by its route, it would enable the proprietors to give additional extension to its accommodations and facilities for transit. There are not so many difficulties to overcome as have been successfully surmounted by the railway between Philadelphia and Columbia, with which road both these gentlemen are quite familiar. I hope you will use all your influence to promote this vastly important work.

I send by Mr. Totten a pamphlet, by J. Butler Williams “on the principles of railway management, and on the profitable increase in the traffic, produced by great reductions in the charges,” which I doubt not will please you much. I have read it with deep interest. It is well worthy of being reviewed by you for the benefit of your numerous readers, doubled [I hope] since the commencement of this year. I refer you particularly to pages 28, 29, 30, 31 and 32, for admirable facts in reference to the increasing prosperity of railways, by giving a pecuniary interest to all the employees, or servants of the companies, in promoting the success of the work. The whole pamphlet is excellent, but I would again urge upon you the importance of amalgamation of companies in our country, for the purpose of having economy in administration, cheap traffic, unity of action, and much greater accommodation to the public, as well as great prosperity to the proprietors.—For example, the whole line of railway from Boston to Buffalo ought to be but one concern—one administration or directory. So between Philadelphia and Chambersburg there ought to be one board of directors only. The clashing and jarring of several boards of directors is very unwise and unprofitable. A very large concern can be infinitely better managed for self-interest as well as the accommodation of the public than several small concerns. This pamphlet treats ably on this subject, as well as upon all that it touches.

I have nothing of importance to tell you about railway matters—everything interesting you can get better from the excellent railway papers you receive from this country than I can tell you.

I am sorry to say the atmospheric system has not advanced as rapidly as I hoped it would; but my confidence in it is not yet shaken. All the difficulties which prevent complete success will no doubt be overcome, as more practice and experience are applied to its development. The community generally are much disappointed that the great majority of the new railway schemes have not taken advantage of the facilities granted by government, “to wind up.” Of those that have met and decided upon the course to be pursued, only about 5 per cent. have agreed to wind up, while it was fully thought that nearly the whole would have been willing to do so. From the perseverance of so many, it is thought too much of the capital of the country will be devoted to this species of enterprise; and the consequence is, money is expected to continue at a very high rate of interest, for a long time to come. It is now fully 5 per cent., and it is not expected to be lower.

The gauge question is not yet decided, but public opinion has settled down in favor of the narrow gauge; not because it is better than a little wider one, but because of the extraordinary inconvenience of a change from one to another. I hope our countrymen will adopt the five feet [the seven feet is found to be too expensive and unnecessarily wide] gauge, or some other, and agree that it shall become universal. But above all things, I hope the existing railroads will make such arrangements by amalgamation with others in extension, as to enable them to carry merchandize, passengers and agricultural produce—but particularly cattle of all kinds—so cheaply, as to increase two or three fold their existing traffic. Low fares suited to the accommodation afforded, [having three class passenger carriages] greater speed, and more punctuality, and our American roads will be very much benefitted. Peace is altogether essential for the development of the mighty resources and wealth of our country. I very much fear it will not be maintained with Mexico, and that hostilities in the Gulf of Mexico will embroil us with Great Britain and other countries.—Nothing is so utterly absurd and wicked as war!

May 29th, 1846.—The Cambria has just arrived, and brings the melancholy account of war between Mexico and our country. Now a stop to all improvements in our country—all railroads, canals, and schemes of all kinds must be abandoned, and the whole resources, and energy and talent of our country must be devoted to carrying on this contemptible war, from which neither party will derive a particle of advantage. How melancholy it is, that nations will be so unwise as to waste their blood and their energies in war! I am distressed beyond measure. I hope Mr. Totten will call upon you.

I am, dear sir, with great regard, yours truly,

GERARD RALSTON.

**Camden, S. C., Branch Railroad.**

The following extract from a letter dated Camden May 30th, gives cheering intelligence in relation to this work. It says,

“We have at length decided upon the route of the Camden Branch and the whole of the grade, I may say, to within 4 or 5 miles of Camden let. The shortest route has been adopted and the length of road as stated to you before is about 39 miles. If we have good luck this summer in getting out timber, and can procure an efficient contractor (as I have no doubt we will,) for the pile work, through the 4 miles of the Wateree swamp, I have no doubt that the first 10 miles extending into Sumter district, will be in use by the beginning of next summer, and there will then be no difficulty in completing the remaining 27 miles to Camden, in six months; the

grading will all be done and nothing to do but to lay the track.

"The spirit is strong. On Monday, 1 o'clock, we are to have a grand railroad convention, to take into consideration the practicability, feasibility and necessity of constructing a railroad from Wilmington, N. C., to some point on the South Carolina railroad.

"The route which this road would take is a rival of that from Raleigh to Camden, and would probably intersect the South Carolina railroad low down. It would have some advantages particularly in the probability of its passing over a more level country than the other. but I doubt whether it would make the main route as short, and it would cross all the river swamps where they are no doubt very wide. This route would afford a good opportunity of displaying the power of the 'pile driver.' (And the way the panting of the iron monster—schew! schew!! schew!!! schew!!!!—as he worked his way through the heavy Cypruss forests, would scare such small fry as owls, alligators, and tadpoles would be a caution.) If the friends of the Raleigh route take up the question as they ought, we may expect to have a spirited contest for the next year."

The following extract from another letter from the same source, of the 10th inst., gives an inkling of what may be anticipated in the south, towards "filling up gaps" in, and removing "eye sores," from the railroad system in that region.

We care not a "farthing candle" which state has the strongest claims to the title of "Rip Van Winkle," if they will only unite in the construction of the deficient links in the chain by which the north and the south are to be bound together in a manner not easily to be separated by fanatics or politicians.

The writer says, "On the 1st of June a large and very respectable delegation of the stockholders of the Wilmington and Weldon railroad co., met the citizens of Sumter and Darling districts, at Sumter, with the view of urging an immediate connection between the North and South Carolina railroads. The objects of the visit of the North Carolina gentlemen were very lucidly explained by Gov. Dudley, president of the Wilmington and Weldon railroad, in a speech in which he endeavored to show that South Carolina was better entitled to the appellation of "Rip Van Winkle," than North Carolina. He was replied to by Col. Moses, on the part of Sumter, Col. Moses was glad to hear that 'Rip Van Winkle' had waked up from his lengthened slumbers, but he hoped that he would not catch the 'game cock' of Sumter napping.

"A committee was appointed to petition the legislature for a charter, and to rouse the people to the importance of the undertaking, etc.

"The meeting which was quite a numerous one, then adjourned, and the North Carolina gentlemen went home determined to commence the work at their end immediately. So you see there is some prospect of this gap being filled up, this 'eye sore' removed. This meeting, I am told has had the effect of waking up Charleston to the injury which an interior route would inflict upon her by throwing her off the main thoroughfare between the north and south, and I have no doubt that an effort will be made to revive the 'All Saints railroad co.,' which was intended to connect Wilmington, [N. C.] with Charleston.

"There are three routes by which this gap may be closed: 1st, from Wilmington to Charleston; 2d, from Wilmington by Sumterville to the Camden; road; 3rd, from Raleigh to Camden.

"At the present time the contest appears to be be-

tween Charleston and Sumterville, but in my opinion the route which would suit the travelling public [I mean the travel between the north and southwest] would be best accommodated by the route from Raleigh to Camden. This route passes through a healthy country, is 80 miles shorter than the present steamboat route by Wilmington and Charleston, and would be probably 60 miles shorter than the railroad route through Wilmington and Charleston.

"I wonder some of your northern capitalists do not take this matter in hand. The Raleigh and Gaston road, which cost originally \$1,600,000 was sold last winter for less than \$400,000—less than one-fourth its original cost, surely if it is worth anything it is worth this. Yours truly."

#### Mr. Hodgkinson's Report.

Summary of Results offered, in conjunction with one by Wm. Fairbairn, Esq., M. Inst. C. E., to Robert Stephenson, M. Inst. C. E., etc., etc., for the Directors of the Chester and Holyhead Railway, on the subject of a proposed Bridge across the Menai near to Bangor—By Eaton Hodgkinson, F. R. S.

Having in the month of August last year been requested to render assistance, principally in a scientific point of view, with respect to the experiments to ascertain the practicability of erecting a tubular bridge across the Menai straits, of sufficient strength for railway trains to pass through it with safety, I attended twice in London for that purpose: and as the experiments made there were on tubes of various forms of section, including several elliptical and circular ones, I investigated formula for reducing the strength of the leading ones. It appeared evident to me however, that any conclusions deduced from received principles, with respect to the strength of thin tubes, could only be approximations; for these tubes usually give way by the top or compressed side becoming wrinkled, and unable to offer resistance, long before the parts subjected to tension are strained to the utmost they would bear. To ascertain how far this defect which had not been contemplated in the theory, would affect the truth of computations on the strength of the tubes proposed to be used in the bridge,—and also to show whether the principles generally received could be applied with certainty in reasoning as to the strength of the bridge from that of models comparatively very small,—for these two purposes I urged the necessity of a number of fundamental experiments, which, besides supplying the wants above mentioned, might enable me to obtain additional information to that from Mr. Fairbairn's experiments, with respect to the proportions that the different parts of the section of such a bridge ought to have, as well as what form it should be of, in order to bear the most.

Feeling that there might be objections against allowing me to follow the courses I proposed, however necessary it might appear to myself, I suggested a much more limited series of experiments than now appear to me to be necessary; and as the time consumed in getting the plates rolled and the tubes prepared, caused the experiments to be delayed till the beginning of the year, the time given me has been too limited to obtain all the facts which the few experiments proposed would have afforded.

I will now give the results, so far as they have been obtained and seem worthy of reliance, subject to correction from future exper-

iments, beginning with the reduction of Mr. Fairbairn's experiments on the strength of tubes of wrought iron made of plates rivetted together.

**Cylindrical Tubes.**—The strength of a cylindrical tube, supported at the ends, and loaded in the middle, is expressed by the formula

$$w = \frac{p f}{a l} (a^4 - a'^4)$$

Where  $l$  is the distance between the supports;  $a, a'$  the external and internal radii;  $w$  the breaking weight;  $f$  the strain upon a unity of section, as a square inch, at the top and bottom of the tube, in consequence of the weight  $w$ ;  $p = 3:14159$ .

From this formula we obtain,

$$f = \frac{w l a}{p (a^4 - a'^4)}$$

As it will be convenient to know the strain  $f$  per square inch, which the metal at the top and bottom of the tube is bearing when rupture takes place, this value will be obtained from each of Mr. Fairbairn's experiments; the value  $w$  being made to include, besides the weight laid on at the time of fracture, the pressure from the weight of the tube between the supports, this last being equal to half that weight. Computing the results, we have, from

Experiment 1, $f = 33456$	
" 2, $f = 32426$	
" 3, $f = 35462$	
" 4, $f = 32415$	
" 5, $f = 30078$	Mean 29887 lb. = 13.34 tons.
" 6, $f = 33869$	
" 7, $f = 22528$	
" 8, $f = 22655$	
" 9, $f = 25095$	

Fracture in all cases took place either by the tube failing at the top, or tearing across at the rivet holes; this happened on the average, as appears from above, when the metal was strained 13.3 tons per square inch, or little more than half of its full tensile strength.

**Elliptical Tubes.**—The value of  $f$  in an elliptical tube broken as before, (the transverse axis being vertical,) is expressed by the formula,

$$f = \frac{w l a}{p (b a^3 - b' a'^3)}$$

Where  $a, a'$  are the semitransverse external and internal diameters;  $b, b'$  the semi-conjugate external and internal diameters; and the rest as before  $w$  including in all cases the pressure from the weight of the beam.

Computing the results from Mr. Fairbairn's experiments we have from

Experiment 20, $f = 36938$	Mean 37089 lb. = 16.55 tons.
" 21, $f = 29144$	
" 24, $f = 45185$	

**Rectangular Tubes.**—If in a rectangular tube, employed as a beam, the thickness of the top and bottom be equal, and the sides are of any thickness at pleasure, then we have

$$f = \frac{3 w l d}{2 (b d^3 - b' d'^3)}$$

in which  $d, d'$  are the external and internal depths respectively;  $b, b'$  the external and internal breadths; and the rest as before.

Mr. Fairbairn's experiment No. 14 gives by reduction  $f = 18495$  lb. = 8.2566 tons.

This is, however, much below the value which some of my own experiments give, as will be seen further on.

The value of  $f$ , which represents the strain

upon the top or bottom of the tube when it gives way, is the quantity per square inch which the material will bear either before it becomes crushed at the top side or torn assunder at the bottom. But it has been mentioned before, that thin sheets of iron take a corrugated form with a much less pressure than would be required to tear them assunder; and therefore the value of  $f$ , as obtained from the preceding experiments, is generally the resistance of the material to crushing, and would have been so in every instance if the plates on the bottom side (subjected to tension) had not been rendered weaker by rivetting.

The experiments made by myself were directed principally to two objects:

I. To ascertain how far this value of  $f$  would be affected by changing the thickness of the metal, the other dimensions of the tube being the same.

II. To obtain the strength of tubes, precisely similar to other tubes fixed on,—but proportionately less than the former in all their dimensions, as length, breadth, depth and thickness,—in order to enable us to reason as to strength from one size to another, with more certainty than hitherto, as mentioned before. Another object not far pursued, was to seek for the proper proportion of metal in the top and bottom of the tube. Much more is required in this direction.

In the three series of experiments made, the tubes were rectangular, and the dimensions and other values are given below.

Length.	Depth.	Breadth.	Distance between supports.	Weight.	Thickness of plates.	Last observed deflection.	Corresponding weight.	Break'g weight.	Value of $f$ , for crushing strain.
ft. in.	in.	in.	ft. in.	cwt. qr.	in.	in.	tons.	tons.	tons.
31 6	24 16	30 0	44 3	525	3-03	56-3	57-5	19-17	
31 6	24 16	30 0	24 1	272	1-53	20-3	22-75	14-49	
31 6	24 16	30 0	10 1	124	1-20	5-04	5-53	7-74	
				lb. oz.		lb.	lb.		
8 2	6 4	7 6	78 13	132	66	9,416	9,976	23-17	
8 2	6 4	7 6	38 11	065	32	2,696	3,156	15-31	
8 2	6 4	7 6							
4 2 1/2	3 2	3 9	10 12	061	435	2,464	2,464	24-56	
4 3 1/2	3 2	3 9	4 15	03	13	560	672	13-42	

The tube placed first in each series, is intended to be proportional in every leading dimension, as distance between supports, breadth, depth, and thickness of metal,—and any variations are allowed for in the computation.—Thus the three first tubes of each series are intended to be similar; and in the same manner of the other tubes, etc.

\* Looking at the breaking weights of the tubes varying only in thickness, we find a great falling off in the strength of the thinner ones; and the values of  $f$  show that in these—the thickness of the plates being .525, .272, .124 inch—the resistance, per square inch, will be 19-17, 14-47, and 7-74 tons respectively. The breaking weights here employed, do not include the pressure from the weight of the beam.

The value of  $f$  is usually constant in questions on the strength of bodies of the same nature, and represents the tensile strength of the material, but it appears from these experiments that it is variable in tubes, and represents their power to resist crippling. It depends upon the thickness of the matter in the tubes, when the depth or diameter is the same; or upon the thickness divided by the depth when that varies. The determination of the value of  $f$ , which can only be obtained by experiment, forms the chief obstacle to obtaining a formula

for the strength of tubes of every form.—When  $f$  is known the rest appears to depend upon received principles, and the computation of the strength may be made as in the Application de la Mécanique of Navier, part 1st, article IV.; or as in papers of my own in the Memoirs of the Literary and Philosophical Society of Manchester, vols. 4 and 5, second series. I have however, made for the present purpose, further investigations on this subject but defer giving them till additional information is obtained on the different points alluded to in this report; and this may account for other omissions.

In the last table of experiments the tubes were devised to lessen or to avoid the anomalies which rivetting introduces, in order to render the properties sought for more obvious.—Hence, the results are somewhat higher than those which would be obtained by rivetting as generally applied.

The tube 31 feet 6 inches long, 24 cwt. 1 qr. weight, and .272 inch in thickness of plates, was broken by crushing at the top with 22-75 tons. This tube was afterwards rendered straight, and had its weak top replaced by one of a given thickness, which I had obtained from computation; and the result was, that by a small addition of metal, applied in its proper proportion to the weakest part, the tube was increased in strength from 22-75 tons to 32-53 tons; and the top and bottom gave way together.

If it be determined to erect a bridge of tubes I would beg to recommend that suspension chains be employed as an auxiliary, otherwise great thickness of metal would be required to produce adequate stiffness and strength.

EATON HODKINSON.

#### Railroad Convention.

Waynesboro', Burke Co., May 19.

Pursuant to previous notice, the respective delegation of the cities of Savannah and Augusta, and of this county, with a large number of the citizens of the latter, convened today in the court house, when, on motion of Mulford Marsh, Esq., the Hon. JOHN WHITEHEAD was called to the chair, and JOSEPH B. JONES appointed secretary. The following delegates were in attendance, to wit:

From Savannah.—Messrs. George Jones, W. B. Hodgson, R. R. Cuyler, S. T. Chapman, Robt. A. Allen, T. C. Nesbitt, M. Marsh, and L. O. Reynolds.

From Augusta.—Messrs. Andrew J. Miller, John Schley, George Schley, C. R. Holt, John C. Sneed, Eben. Starnes, J. J. R. Flournoy, John George, E. Y. Harris, Jas. Gardner, and Chas. J. Jenkins.

From Burke County.—J. W. Carswell, A. Wiggins, J. H. Hines, Edmond Palmer, Wm. Sapp, Wm. Hughes, Henry Hargroves, Wm. Byne, Jas. Rayals, J. P. C. Whitehead, Edward Tabb, Robert Gray, J. J. Heath, Chas. Burton, John Gordon, James Grubbs, S. J. Cox, Allen Inman, Moses Green, Jas. W. Jones, Jas. McGruder, Henry Lewis, Wright Murphy, Benj. Lewis, John C. Poythress, C. W. West, John Whitehead, Job Gresham, S. W. Blount, Abell Lewis, Benj. E. Gilatrop, Joseph B. Jones, and Geo. W. Evans.

In reply to a request by the chair, R. R. Cuyler, Esq., of Savannah, stated the object of the present convention to be, a consultation as to the propriety of, and the measures proper to be taken, with a view to the construction

of a branch railroad from the city of Augusta, by the way of Waynesboro', to the 80 mile station, or some other point upon the Central railroad; and briefly remarked the vast importance of the completion of the proposed road to the communities more immediately interested, but more especially its influence as a part of the great chain of railways in Georgia, in binding more strongly the near as well as most distant parts of our state, in social and intimate intercourse; and in conclusion, Mr. C. expressed gratification at the evidences around him of the interest felt by the citizens of Burke in the proposed undertaking, assured them that if they would begin the work with energy and determination, they might certainly calculate upon liberal pecuniary aid from the citizens of Savannah.

Dr. C. W. West then proposed the following preamble and resolutions:

Whereas, it is believed to be highly expedient and proper that a continuous railroad communication between the cities of Savannah and Augusta, by the way of Waynesboro', in Burke co., should be completed at the earliest practicable period, and that the commissioners named in the act of incorporation passed by the legislature in the year 1838, should take measures for the organization of the company chartered for the afore-mentioned purpose.

Resolved, That a committee of nine members be appointed by the president of this convention for the purpose of conferring with the corporate authorities of Savannah and Augusta, as well as with the Georgia and Central railroad companies, in order to ascertain what facilities and encouragement said corporations are willing to afford in the accomplishment of this desirable object, and that said committee be requested to report the result of the said conference to an adjourned meeting of this convention to be held in Waynesboro', on the first Tuesday of November next.

Resolved, That said committee be authorized to report at the same time upon the practicability and importance of the proposed work, as well as its probable cost and income when completed; the best means of raising the necessary funds for its construction, and the manner in which it could most profitably be controlled and operated; together with such other suggestions as said committee may deem proper and expedient.

Which resolutions were, after discussion, adopted.

Chas. J. J. Jenkins, Esq., of Augusta, being called upon, responded heartily to the sentiments and feelings of the gentleman from Savannah, Mr. Cuyler, concurring too in the suggestions made as to the advantages, local and general, of the proposed work, but thought that final action should not now be taken, but further time allowed for enquiry, and the expression of opinion by those who were to bear the burden of its construction, and recommending the adoption of the resolutions offered as pointing out the proper course.

Andrew J. Miller, Esq., of Augusta, answering the call of the house, addressed the

convention to the same purpose as his colleague. Viewing this convention as advisory altogether, he thought it unwise to adopt final measures, but was a warm friend to the road.

Mr. Hodgson, of Savannah, briefly stated his anxiety to see the work undertaken, and would be found ready at the proper time to engage in it.

Mulford Marsh, Esq., of the same place, offered resolutions as amendments of the preceding—and looking to more speedy action upon the matter that had brought them together, and after reviewing hastily the facilities and advantages for the transportation of the planter's produce to market afforded to almost every section of the state, by the roads now in operation, urged the undertaking of the present work, by noticing the particular benefit to the planters of this county, of the Central railroad. The amendment was, however, withdrawn at the suggestion of Mr. Chapman, of Savannah, who thought that in the present uninformed state of the public mind upon the subject before the convention, if matters were pressed too hastily, many might commit themselves, who, after better examination and conviction of the vast importance of the work, would render valuable assistance.

Ed. J. Black, Esq. of Scriven, though not a delegate, was invited to address the convention, and replied in effect, that looking upon Augusta, and Savannah in their corporate capacities only, he felt little gratification or concern at the prospect of any local advantage which they might receive from the road, but viewing them as part and parcel of the great domain of Georgia, containing a large number of the citizens thereof, he could rejoice with others in the adoption of any plan, or the completion of any work, which might advance their interests. And looking upon the road, when completed, as an instrument for breaking down the obstacles heretofore interposed to the ready and free interchange of commercial advantages of these two important points of the state, and more especially where he could see in its operation an active agency in advancing the great cause of free trade, he would give them his hearty co-operation, and wished the convention a God-speed towards its completion.

It was on motion of Mr. Gardner, of Augusta,

Resolved, That the counties of the state which may feel interested in the work, be invited to appoint delegates to the convention, to participate in its deliberations.

Resolved further, That the counties now represented in this convention be requested to add to the present number of their delegates as many as they may think proper, with a view to the promotion of the objects of this convention.

It was then on motion,

Resolved, That the proceedings of this convention be published in the Augusta and Savannah papers.

The convention then adjourned until the first Tuesday in November next.

JOHN WHITEHEAD, Chairman.

Jos. B. Jones, Secretary.

**Elephant and Locomotive.**—The union related in the following, being none other than an elephant with a locomotive, may be recorded for its eccentricity. At Morpeth, according to the *Gateshead Observer*, a north British locomotive engine arrived drawn by 15 horses. The manager of Wombwell's menagerie made an offer of the service of the elephant to assist the horses in surmounting the hill, which was at once accepted; the elephant cheerfully undertook the task, and tugged, never once pausing, until he reached the summit of the hill. This, we should think, is the first instance of an elephant trying his powers against an iron horse.

**The Peace Mission of Railways.**—For once establish railroads and abolish preventive duties through Europe, and what is there left to fight for? It will matter very little then under what flag people live, and foreign ministers and ambassadors may enjoy a dignified sinecure; the army will rise to the rank of peaceful constables, not having any more use for their bayonets than those worthy people have for their weapons now, who accompany the law at assizes under the name of javelin-men. The apparatus of bombs and 84 pounders may disappear from the Alameda, and the crops of cannon balls which now grow there, may give place to other plants more pleasant to the eye; and the great key of Gibraltar may be left in the gate for anybody to turn at will, and Sir Robert Wilson may sleep in quiet.—*Titmarsh's Cairo.*

### A CARD.

#### TO THE CITIZENS OF NEW YORK.

After a residence of over twenty-one years in this city, I find it for my interest to seek, in a neighboring city, a new home, where I hope to derive more ample reward for honest and unremitting industry and enjoy the satisfaction of knowing that my past labors have contributed somewhat to the general prosperity, if not materially to my own.

Having, for so long a period, participated in the excitements and activity of this growing city, and witnessed its prosperity and rapid advancement—yet without sharing largely in its enjoyments—I cannot leave it without regret, nor without acknowledging my obligations, and gratitude, to the many kind friends, who have at all times cheered and encouraged me on; but more especially to those few who so generously sustained me at a period when all was lost, save a determination to succeed.—Here I have labored for the general prosperity; and have the vanity to believe that the great destiny that awaits you has not been retarded by my efforts; there I shall provide the comforts required by the body—and therefore solicit in my new habitation, and new vocation, a continuance of your approval, and an increase of your patronage. I shall feel, while I labor for the wants of the outer man—while I provide and supply, in a superior manner, the comforts and social enjoyments of life—that I am but “laboring in the vocation” that contributes “the greatest good to the greatest number.”

In the “FRANKLIN HOUSE,” 105 Chestnut street, Philadelphia, heretofore kept by Messrs. J. M. SANDERSON & SON—my future residence after the 1st of July—I hope to meet many of those faces which, during a long residence here, have become familiar to me, and grasp many an honest hand,

and exchange many a kind salutation, with warm and sincere friends.

The house is now undergoing a thorough renovation, and extensive improvements are to be made, by the addition of a convenient and well arranged *ladies ordinary*, a spacious new dining room for gentlemen, several new parlors, and many new and convenient lodging rooms. It will be newly painted throughout, and mainly refurnished, and thus be placed on a footing with the best Hotels in Philadelphia. I shall be aided in its management, by Mr. JAMES M. SANDERSON, long favorably known as one of the gentlemanly proprietors of the FRANKLIN HOUSE, and as a caterer unsurpassed in the country; and also by the celebrated *Chef de Cuisine* PELLETIER, who has also been connected with the house during the past four years, and whose superior, as an *artiste* in his line, in this country, is yet to be found.

With such a house, and such aid in its management, I do not hesitate to say, to those friends and acquaintances who have known me during the past twenty years, and to others who have not, that they will find good accommodation, good fare, and all desirable attention to their wishes when they call at the FRANKLIN HOUSE, and upon their obedient servant,  
D. K. MINOR.

**NICOLL'S PATENT SAFETY SWITCH** for Railroad Turnouts. This invention, for some time in successful operation on one of the principal railroads in the country, effectually prevents engines and their trains from running off the track at a switch, left wrong by accident or design.

It acts independently of the main track rails, being laid down, or removed, without cutting or displacing them.

It is never touched by passing trains, except when in use, preventing their running off the track. It is simple in its construction and operation, requiring only two Castings and two Rails; the latter, even if much worn or used, not objectionable.

Working Models of the Safety Switch may be seen at Messrs. Davenport and Bridges, Cambridgeport, Mass., and at the office of the Railroad Journal, New York.

Plans, Specifications, and all information obtained on application to the Subscriber, Inventor, and Patentee.

G. A. NICOLLS,

Reading, Pa.

ja45

**GEORGE VAIL & CO., SPEEDWELL IRON** Works, Morristown, Morris Co., N. J.—Manufacturers of Railroad Machinery; Wrought Iron Tires, made from the best iron, either hammered or rolled, from 1½ in. to 2½ in. thick.—bored and turned outside if required. Railroad Companies wishing to order, will please give the exact inside diameter, or circumference, to which they wish the Tires made, and they may rely upon being served according to order, and also punctually, as a large quantity of the straight bar is kept constantly on hand.—Crank Axles, made from the best refined iron; Straight Axles, for Outside Connection Engines; Wro't. Iron Engine and Truck Frames; Railroad Jack Screws; Railroad Pumping and Sawing Machines, to be driven by the Locomotive; Stationary Steam Engines; Wro't. Iron work for Steamboats, and Shafting of any size; Grist Mill, Saw Mill and Paper Mill Machinery; Mill Gearing and Mill Wright work of all kinds; Steam Saw Mills of simple and economical construction, and very effective Iron and Brass Castings of all descriptions.

ja451y

**RAILROAD IRON—1700 TONS VERY** Best English Rails, ready to be delivered.—These Rails weigh 60 lbs., the lineal Yard, are 3½ inches deep; 4 inches deep at base; 2½ inches wide at top; 17½ feet long, except one-tenth of 15 and 19½ feet in length.

A first rate Steam Pile Driver built by “Dunham & Co.,” has never been in use, is in perfect order, and for sale a bargain; also 12 Railway Passenger Cars that have never been used, which will be sold very low.

DAVIS, BROOKS & CO.,

June 1, 30 Wall Street.

**VALUABLE PROPERTY ON THE MILL Dam For Sale.** A lot of land on Gravelly Point, so called, on the Mill Dam, in Roxbury, fronting on and east of Parker street, containing 68,497 square feet, with the following buildings thereon standing.

Main brick building, 120 feet long, by 46 ft wide, two stories high. A machine shop, 47x43 feet, with large engine, face, screw, and other lathes, suitable to do any kind of work.

Pattern shop, 35x32 ft, with lathes, work benches, Work shop, 86x35 feet, on the same floor with the pattern shop.

Forge shop, 118 feet long by 44 feet wide on the ground floor, with two large water wheels, each 16 feet long, 9 ft diameter, with all the gearing, shafts, drums, pulleys, &c., large and small trip hammers, furnaces, forges, rolling mill, with large balance wheel and a large blowing apparatus for the foundry.

Foundry, at end of main brick building, 60x45 feet two stories high, with a shed part 45x20 feet, containing a large air furnace, cupola, crane and corn oven.

Store house—a range of buildings for storage, etc., 200 feet long by 20 wide.

Locomotive shop, adjoining main building, fronting on Parker street, 54x25 feet.

Also—A lot of land on the canal, west side of Parker st., containing 6000 feet, with the following buildings thereon standing:

Boiler house 50 feet long by 30 feet wide, two stories.

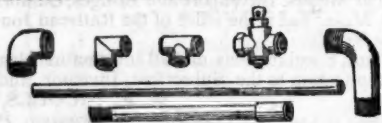
Blacksmith shop, 49 feet long by 20 feet wide. For terms, apply to HENRY ANDREWS, 48 State st., or to CURTIS, LEAVENS & CO., 106 State st., Boston, or to A. & G. RALSTON & CO., Philadelphia. ja46

**TO RAILROAD COMPANIES AND BUILDERS OF MARINE AND LOCOMOTIVE ENGINES AND BOILERS.**

#### PASCAL IRON WORKS.

#### WELDED WROUGHT IRON TUBES

From 4 inches to 1 in calibre and 2 to 12 feet long, capable of sustaining pressure from 400 to 2500 lbs. per square inch, with Stop Cocks, T, L, and other fixtures to suit, fitting together, with screw joints, suitable for STEAM, WATER, GAS, and for LOCOMOTIVE and other STEAM BOILER FLUES.



Manufactured and for sale by MORRIS, TASKER & MORRIS. Warehouse S. E. Corner of Third & Walnut Streets, PHILADELPHIA.

**TO LOCOMOTIVE AND MARINE ENGINE BOILER BUILDERS.** Pascal Iron Works, Philadelphia. Welded Wrought Iron Flues, suitable for Locomotives, Marine and other Steam Engine Boilers, from 2 to 5 inches in diameter. Also, Pipes for Gas, Steam and other purposes; extra strong Tube for Hydraulic Presses; Hollow Pistons for Pumps of Steam Engines, etc. Manufacture! and for sale by

MORRIS TASKER & MORRIS, Warehouse S. E. corner 3d and Walnut Sts., Philadelphia 1tf

#### LAP—WELDED WROUGHT IRON TUBES

FOR TUBULAR BOILERS, FROM 1 1-2 TO 5 INCHES DIAMETER, and

ANY LENGTH, NOT EXCEEDING 17 FEET.

These Tubes are of the same quality and manufacture as those so extensively used in England, Scotland, France and Germany, for Locomotive, Marine and other Steam Engine Boilers.

THOMAS PROSSER,

Patentee.

25 28 Platt street, New York.

**ENGLISH PATENT WIRE ROPES—FOR THE USE OF MINES, RAILWAYS, ETC.—** for sale or imported to order by the subscriber.

These Ropes are manufactured on an entirely different principle from any other, and are now almost exclusively used in the collieries and on the railways in Great Britain, where they are considered to be greatly superior to hempen ones, or iron chains, as regards safety, durability and economy. The plan upon which they are made effectually secures them from corrosion in the interior, as well as the exterior of the rope, and gives a greater compactness and elasticity than is found in any other manufacture.

Many of these ropes have been in constant operation in the different mines in England, and on the Blackwall and other inclined planes, for three and four years, and are still in good condition.

They have been applied to almost every purpose for which hempen ropes have been used—mines, heavy cranes, standing rigging, window cords, lightning conductors, signal halyards, tiller ropes, etc. Reference is made to the annexed statement for the relative strength and size. Testimonials from the most eminent engineers in England can be shown as to their efficiency, and any additional information required respecting the different descriptions and application will be given by

ALFRED L. KEMP, 75 Broad street, New York, sole agent in the United States.

Statement of Trial made at the Woolwich Royal Dock Yard, of the Patent Wire Ropes, as compared with Hempen Ropes and Iron Chains of the same strength.—October, 1841.

WIRE ROPES.				HEMPEN ROPES.				CHAINS.		STRENGTH.
Wire gauge number.	Circumference of rope.	Weight per fathom.		Circumference of rope.	Weight per fathom.			Weight per fathom.	Diameter of iron.	
	INCH.	LBS.	OZ.	INCH.	LBS.	OZ.		LBS.	INCH.	Tons.
11	4 1/4	13	5	10	24	-		50	15-16	20
13	3 1/2	8	3	8 1/2	16	-		27	11-16	13 1/2
14	3 1/4	6	11	7 1/2	12	8		17	9-16	10 1/2
15	2 3/4	5	2	6 1/2	9	4		13 1/2	1-2	7 1/2
16	2 1/2	4	3	6	8	8		10 1/2	7-16	7

N.B. The working load, with a perpendicular lift, may be taken at 6 cwt. for every lb. weight per fathom, so that a rope weighing 5 lbs. per fathom would safely lift 3360 lbs., and so on in proportion. 1y24

**RAILROAD IRON.**—The subscriber having taken contracts for all the Railroad Iron he can manufacture at his Iron Works at Trenton, until July next, will gladly receive orders for any quantity to be delivered after that time, not exceeding thirty tons per day. Also has on hand and will make to order Bar Iron, Braziers' Rods, Wire Rods and Iron Wires of all sizes, warranted of the best quality. Also manufactures and has on hand Refined American Isinglass, warranted equal in strength to the Russian. Also on hand a constant supply of Glue, Neats' Oil, &c. &c.

PETER COOPER, 17 Burling Slip. New York, January 23d, 1846. 1y 10

**RAILROAD IRON—500 TONS OF 67 LBS.** per yard—5 inches high—of the double headed pattern, which is now wholly used in England—now on the passage, and a further quantity will be contracted for. Also

500 tons T pattern, 56 lbs. per yard, for sale by BOORMAN, JOHNSTON & CO. 119 Greenwich street. 4:24

**LAWRENCE'S ROSENDALE HYDRAULIC CEMENT.** This cement is warranted equal to any manufactured in this country, and has been pronounced superior to Francis' "Roman." Its value for Aqueducts, Locks, Bridges, Flooms and all Masonry exposed to dampness, is well known, as it sets immediately under water, and increases in solidity for years.

For sale in lots to suit purchasers, in tight papered barrels, by JOHN W. LAWRENCE, 142 Front street, New York.

Orders for the above will be received and promptly attended to at this office. 32 1y

**A. & G. RALSTON & CO., NO. 4** South Front St., Philadelphia, Pa.

Have now on hand, for sale, Railroad Iron, viz: 180 tons 2 1/4 x 4 inch Flat Punched Rails, 20 ft. long. 25 " 2 1/2 x 4 " Flange Iron Rails. 75 " 1 x 4 " Flat Punched Bars for Drafts in Mines. A full assortment of Railroad Spikes, Boat and Ship Spikes. They are prepared to execute orders for every description of Railroad Iron and Fixtures. 1tf

**SPRING STEEL FOR LOCOMOTIVES,** Tenders and Cars. The Subscriber is engaged in manufacturing Spring Steel from 1 1/4 to 6 inches in width, and of any thickness required: large quantities are yearly furnished for railroad purposes, and wherever used, its quality has been approved of. The establishment being large, can execute orders with great promptitude, at reasonable prices, and the quality warranted. Address

JOAN F. WINSLOW, Agent, Albany Iron and Nail Works, 1y

**CALIGRAPHIC BLACK LEAD PENCIL,** Manufactured by E. Wolff and Son, 23 Church Street, Spitalfields, London.

The Caligraphic Pencils have been invented by E. Wolff and Son, after the expenditure of much time and labor. They are the result of many experiments; and every effort that ingenuity and experience could suggest, has been made to insure the highest degree of excellence, and the profession may rely upon their being all that can be desired.

They are perfectly free from grit; and for richness of tone, depth of color, delicacy of tint, and evenness of texture, they are not to be equalled by the best Cumberland Lead that can be obtained at the present time, and are infinitely superior to every other description of Pencil now in use.

The Caligraphic Pencils will also recommend themselves to all who use the Black Lead Pencils as an instrument of professional importance or recreation, by their being little more than half the price of other pencils.

An allowance will be made on every groce purchased by Artists or Teachers.

May be had of all Artists, Colourmen, Stationers, Booksellers, etc.

A single pencil will be forwarded as a sample, upon the receipt of postage stamps to the amount.

Caution.—To prevent imposition, a highly finished and embossed protection wrapper, difficult of imitation, is put around each dozen of Pencils. Each Pencil will be stamped on both sides, "Caligraphic Black Lead, E. Wolff and Son, London."

The subscriber has on hand a full supply of Wolff and Sons celebrated Creta Loevis, or Colored Drawing Chalks, also their pure Cumberland Lead and extra prepared Lead Pencils, and Mathematical Lead Pencils.

P. A. MESIER, Stationer and Sole Agent, No. 49 Wall Street.

N. B.—A complete assortment of Steven's Genuine Inks, Fluids, Imitating Wood stains, and Graining Colours at the Manufacturers prices. 19tf

**MANUFACTURE OF PATENT WIRE** Rope and Cables for Inclined Planes, Standing Ship Rigging, Mines, Cranes, Tillers etc., by JOHN A. ROEBLING, Civil Engineer, Pittsburgh, Pa.

These Ropes are in successful operation on the planes of the Portage Railroad in Pennsylvania, on the Public Slips, on Ferries and in Mines. The first rope put upon Plane No. 3, Portage Railroad, has now run 4 seasons, and is still in good condition. 2v19 1y

**BACK VOLUMES OF THE RAILROAD JOURNAL** for sale at the office, No. 23 Chambers street.

**PATENT HAMMERED RAILROAD, SHIP and Boat Spikes.** The Albany Iron and Nail Works have always on hand, of their own manufacture, a large assortment of Railroad, Ship and Boat Spikes, from 2 to 12 inches in length, and of any form of head. From the excellence of the material always used in their manufacture, and their very general use for railroads and other purposes in this country, the manufacturers have no hesitation in warranting them fully equal to the best spikes in market, both as to quality and appearance. All orders addressed to the subscriber at the works, will be promptly executed. **JOHN F. WINSLOW, Agent.**

Albany Iron and Nail Works, Troy, N. Y. The above spikes may be had at factory prices, of Erastus Corning & Co., Albany; Hart & Merritt, New York; J. H. Whitney, do.; E. J. Etting, Philadelphia; Wm. E. Coffin & Co., Boston. ja45

**PATENT RAILROAD, SHIP AND BOAT Spikes.** The Troy Iron and Nail Factory keeps constantly for sale a very extensive assortment of Wrought Spikes and Nails, from 3 to 10 inches, manufactured by the subscriber's Patent Machinery, which after five years' successful operation, and now almost universal use in the United States (as well as England, where the subscriber obtained a patent) are found superior to any ever offered in market.

Railroad companies may be supplied with Spikes having countersink heads suitable to holes in iron rails, to any amount and on short notice. Almost all the railroads now in progress in the United States are fastened with Spikes made at the above named factory—for which purpose they are found invaluable, as their adhesion is more than double any common spikes made by the hammer.

All orders directed to the Agent, Troy, N. York, will be punctually attended to.

**HENRY BURDEN, Agent.** Spikes are kept for sale, at Factory Prices, by I. & J. Townsend, Albany, and the principal Iron merchants in Albany and Troy; J. I. Brower, 222 Water St., New York; A. M. Jones, Philadelphia; T. Janviers, Baltimore; Degrand & Smith, Boston.

•• Railroad Companies would do well to forward their orders as early as practicable, as the subscriber is desirous of extending the manufacturing so as to keep pace with the daily increasing demand. ja45

## FRENCH AND BAIRD'S PATENT SPARK ARRESTER.

**TO THOSE INTERESTED IN** Railroads, Railroad Directors and Managers are respectfully invited to examine an improved **SPARK ARRESTER**, recently patented by the undersigned.

Our improved Spark Arresters have been extensively used during the last year on both passenger and freight engines, and have been brought to such a state of perfection that no annoyance from sparks or dust from the chimney of engines on which they are used is experienced.

These Arresters are constructed on an entirely different principle from any heretofore offered to the public. The form is such that a rotary motion is imparted to the heated air, smoke and sparks passing through the chimney, and by the centrifugal force thus acquired by the sparks and dust they are separated from the smoke and steam, and thrown into an outer chamber of the chimney through openings near its top, from whence they fall by their own gravity to the bottom of this chamber; the smoke and steam passing off at the top of the chimney, through a capacious and unobstructed passage, thus arresting the sparks without impairing the power of the engine by diminishing the draught or activity of the fire in the furnace.

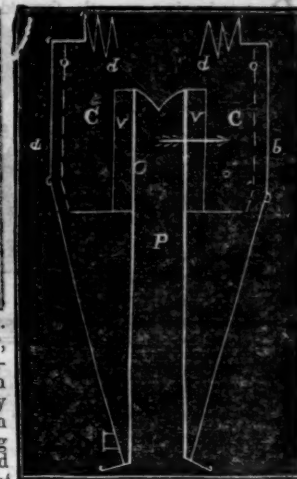
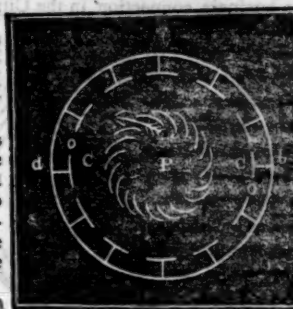
These chimneys and arresters are simple, durable and neat in appearance. They are now in use on the following roads, to the managers and other officers of which we are at liberty to refer those who may desire to purchase or obtain further information in regard to their merits:

E. A. Stevens, President Camden and Amboy Railroad Company; Richard Peters, Superintendent Georgia Railroad, Augusta, Ga.; G. A. Nicolls, Superintendent Philadelphia, Reading and Pottsville Railroad, Reading, Pa.; W. E. Morris, President Philadelphia, Germantown and Norristown Railroad Company, Philadelphia; E. B. Dudley, President W. and R. Railroad Company, Wilmington, N. C.; Col. James Gadsden, President S. C. and C. Railroad Company, Charleston, S. C.; W. C. Walker, Agent Vicksburgh and Jackson Railroad, Vicksburgh, Miss.; R. S. Van Rensselaer, Engineer and Sup't Hartford and New Haven Railroad; W. R. M'Kee, Sup't Lexington and Ohio Railroad, Lexington, Ky.; T. L. Smith, Sup't New Jersey Railroad Trans. Co.; J. Elliott, Sup't Motive Power Philadelphia and Wilmington Railroad, Wilmington, Del.; J. O. Sterna, Sup't Elizabethtown and Somerville Railroad; R. R. Cuyler, President Central Railroad Company, Savannah, Ga.; J. D. Gray, Sup't Macon Railroad, Macon, Ga.; J. H. Cleveland, Sup't Southern Railroad, Monroe, Mich.; M. F. Chittenden, Sup't M. P. Central Railroad, Detroit, Mich.; G. B. Fisk, President Long Island Railroad, Brooklyn.

Orders for these Chimneys and Arresters, addressed to the subscribers, care Messrs. Baldwin & Whitney, of this city or to Hinckly & Drury, Boston, will be promptly executed. **FRENCH & BAIRD.**

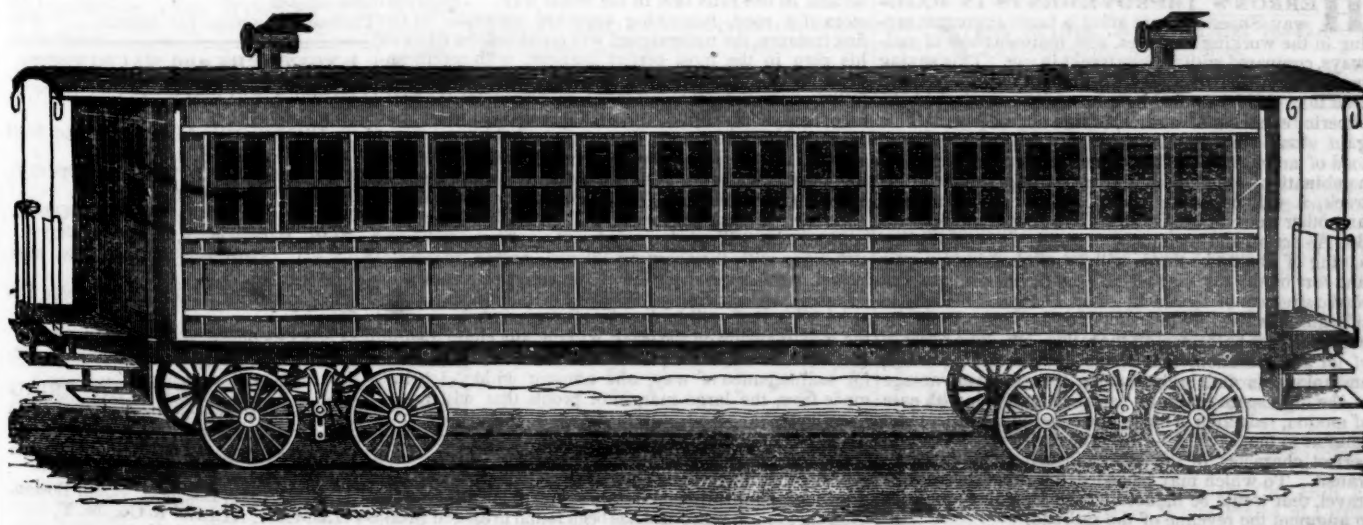
N. B.—The subscribers will dispose of single rights, or rights for one or more States, on reasonable terms. Philadelphia, Pa., April 6, 1844.

•• The letters in the figures refer to the article given in the Journal of June, 1844. ja45



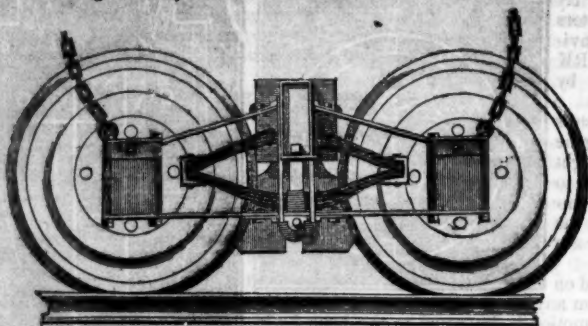
**BENTLEY'S PATENT TUBULAR STEAM BOILER.** The above named Boiler is similar in principle to the Locomotive boilers in use on our Railroads. This particular method was invented by Charles W. Bentley, of Baltimore, Md., who has obtained a patent for the same from the Patent Office of the United States, under date of September 1st, 1843—and they are now already in successful operation in several of our larger Hotels and Public Institutions, Colleges, Alms Houses, Hospitals and Prisons, for cooking, washing, etc.; for Bath houses, Hatters, Silk, Cotton and Woollen Dyers, Morocco Pressers, Soap boilers, Tallow chandlers, Pork butchers, Glue makers, Sugar refiners, Farmers, Distillers, Cotton and Woollen mills, Warming Buildings, and for Propelling Power, etc., etc.; and thus far have given the most entire satisfaction, may be had of D. K. MINOR, 23 Chambers st. New York.

## DAVENPORT & BRIDGES' CAR WORKS.



DAVENPORT & BRIDGES CONTINUE TO MANUFACTURE TO ORDER, AT THEIR WORKS, IN CAMBRIDGEPORT, MASS. Passenger and Freight Cars of every description, and of the most improved pattern. They also furnish Snow Ploughs and Chilled Wheels of any pattern and size. Forged Axles, Springs, Boxes and Bolts for Cars at the lowest prices. All orders punctually executed and forwarded to any part of the country. Our Works are within fifteen minutes ride from State street, Boston—coaches pass every fifteen minutes. 1y1

# RAY'S EQUALIZING RAILWAY TRUCK.—THE SUBSCRIBER HAVING RECENTLY FORMED A BUSINESS CONNECTION IN THE CITY OF NEW



York, expressly for the manufacture of the newly patented and highly approved Railroad Truck of Mr. Fowler M. Ray, is ready to receive orders for building the same, from Railroad Companies and Car Builders in the United States, and elsewhere.

The above Truck has now been in use from one to two years on several roads a sufficient length of time to test its durability, and other good qualities, and to satisfy those who have used it, as may be seen by reference to the certificates which follow this notice.

There have been several improvements lately introduced upon the Truck, such as additional springs in the bolster of passenger cars, making them delightful riding cars—adapting it to tenders, trucks forward of the locomotive, and freight cars, which, with its original good qualities, make it in all respects the most desirable truck now offered to the public.

Orders for the above, will, for the present, be executed at the New York Screw Mill, corner 33d street and 3d avenue, (late P. Cooper's rolling mills) and at the Steam Engine Shop of T. F. Secor & Co., foot of 9th street, East

river, (of which firm the subscriber was late a partner) under the immediate supervision of Mr. Ray himself.

Several sets of trucks containing the latest improvements have recently been turned out for the New York and Erie railroad, and the New Jersey Transportation company, which may be seen upon said roads.

The patronage of Railroad Companies and Car Builders is respectfully solicited.

New York, May 4, 1846.

W. H. CALKINS, and Others.

To all whom it may concern:—This is to certify that the New Haven, Hartford and Springfield railroad co., have had in use six sets of F. M. Ray's patent trucks for the last 20 months, during which time it appears to me, they have proved to be the best and most economical truck now in use.

[Signed,]

WILLIAM ROE, Sup't of Power.

I certify that F. M. Ray's Patent Equalizing Railroad Truck has been in use on the Philadelphia and Reading railroad for some time past, under a passenger car.

For simplicity of construction, economy in cost, lightness of material, and extreme ease of motion, I consider it the best truck we have ever used. Its peculiar make also renders it less liable to be thrown off the track, when passing over any obstruction. We intend using it extensively under the passenger and freight cars of the above road.

Reading, Pa., October 6, 1845.

[Signed,] G. A. NICOLL,

Sup't Transportation, etc., Philadelphia and Reading Railroad.

To all whom it may concern:—This is to certify that the N. Jersey Railroad and Transportation company have used Fowler M. Ray's Truck for the last seven months, during which time it has operated to our entire satisfaction. I have no hesitation in saying that it is the simplest and most economical truck now in use.

[Signed,] T. L. SMITH,

Jersey City, November 4, 1845.

N. Jersey Railroad and Transp. Co.

This is to certify that F. M. Ray's Patent Equalizing Railroad Truck has been in use on the Long Island railroad for the last year, under a freight car.

For simplicity of construction, economy in cost, lightness of material and ease of motion, I consider it equal to any truck we have in use.

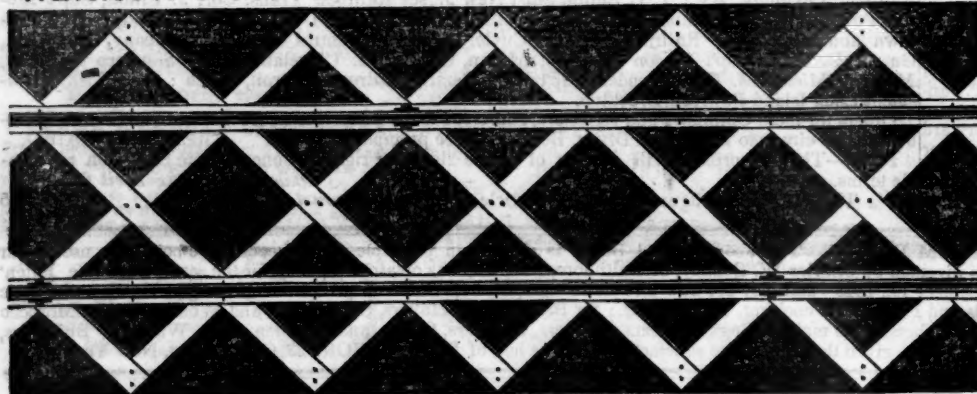
Long Island Railroad Depot,

[Signed,] JOHN LEACH,

Jamaica November 12, 1845.

1y19 Sup't Motive Power.

## HERRON'S PATENT AMERICAN RAILWAY TRACK,



As seen stripped of the top ballasting

**HERRON'S IMPROVEMENTS IN RAILWAY SUPERSTRUCTURE** effect a large aggregate saving in the working expenses, and maintenance of railways, compared with the best tracks in use. This saving is effected—1st, Directly by the amount of the increased load that will be hauled by a locomotive, owing to the superior evenness of surface, of line and of joint. This gain alone may amount to 20 per cent. on the usual load of an engine.—2d, In consequence of the thorough combination, bracing, and large bearing surface of this track, it will be maintained in a better condition than any other track in use, at about one-third the expense.—3d, As action and reaction are equal, a corresponding saving of about two-thirds will be effected in the wear and tear of the engines and cars, by the even surface and elastic structure of the track.—4th, The great security to life, and less liability to accident or damage, should the engine or cars be thrown off the rails.—5th, The absence of jar and vibration, that shake down retaining walls, embankments and bridges.—6th, The great advantage of the high speed that may be safely attained, with ease of motion, reduction of noise, and consequently increased comfort to the traveller.—7th, The really permanent and perfect character of the Way, insuring regularity of transit. To which may be added the great increase of travel, that would be induced by the foregoing qualities to augment the revenue of the railroad.

The cost of the Patent track will depend on the quantity and cost of iron and other materials; but it will not exceed, even including the preservation of the timber, the average cost of the tracks on our principal railroads. Generally, the timber structure, fastenings and workmanship, exclusive of the cost of the iron rails, will be from \$2,300 to \$4,000 per mile. On this structure, rails of from 40 to 50 lbs. per yard, will be equal in effect to

60 and 70 lbs. rails laid in the usual way. The proprietors of a road, furnishing approved materials in the first instance, the undersigned will construct the track on his plan in the most perfect manner, with recent improvements, for one thousand dollars per mile. And he will farther contract to maintain said track for the period of ten years, furnishing such preserved timber and iron fastenings as may be required, and keeping said track in perfect adjustment, under any trade not exceeding 100,000 tons per annum, or its equivalent in passenger transportation, for Two hundred dollars per mile per annum.\* To insure the faithful performance of this contract, he will pledge one-fourth of the cost of construction, with the accruing interest thereon, regularly vested, until the completion of the contract. So that a company, by securing payment to the undersigned at the specified period, will have only \$750 per mile to pay for the workmanship on the track, without any charge being made for the use of the patent, the subsequent payments, for maintenance of way, and amount withheld, being made from the large margin of profits that will result from its use.

JAMES HERRON.

Civil Engineer and Patentee.

No. 277 South Tenth St., Philadelphia.

\* A general average of the repairs done on six of the most successful railroads in this country, for a period of from six to eight years' use has been found to exceed \$625 per mile per annum, exclusive of renewal of rails. But few roads in this country carry as much as 100,000 tons per annum. When a road exceeds that quantity, the repairs due to the additional tonnage, up to 200,000 tons, will be charged at one mill per ton; over the latter, and not exceeding 300,000 tons, nine-tenths of a mill, etc. Where there are two tracks to maintain, a large reduction upon those rates will be made.

**THE AMERICAN RAILROAD JOURNAL** is the only periodical having a general circulation throughout the Union, in which all matters connected with public works can be brought to the notice of all persons in any way interested in these undertakings. Hence it offers peculiar advantages for advertising times of departure, rates of fare and freight, improvements in machinery, materials, as iron, timber, stone, cement, etc. It is also the best medium for advertising contracts, and placing the merits of new undertakings fairly before the public.

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